



# U.S. PREPARATION FOR THE 1979 U.N. CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

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## HEARING

BEFORE THE

SUBCOMMITTEE ON SCIENCE,  
TECHNOLOGY, AND SPACE

OF THE

COMMITTEE ON COMMERCE, SCIENCE,  
AND TRANSPORTATION

STATE

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FIRST SESSION

ON

U.S. PREPARATION FOR THE 1979 U.N. CONFERENCE ON  
SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

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# CONTENTS

	Page
Opening statement by Senator Stevenson-----	1
Opening statement by Senator Schmitt-----	1

## CHRONOLOGICAL LIST OF WITNESSES

DECEMBER 15, 1977

Benson, Hon. Lucy Wilson, Under Secretary for Security Assistance, Science, and Technology, Department of State; Rev Theodore M. Hesburgh, president, University of Notre Dame, and Chairman, U.S. Delegation to the U.N. Conference on Science and Technology for Development and Hon. Jean M. Wilkowski, Coordinator of U.S. Preparations for the U.S. Conference on Science and Technology for Development-----	3
Carey, William D., executive officer, American Association for the Advancement of Science; Rodney Nichols, vice president, The Rockefeller University; Robert Stein, director, North American Office, International Institute for Environment and Development; and William N. Ellis, coordinator, Transitional Network for Appropriate/Alternative Technologies-Tranet-----	137
Prepared statement of Mr. Seltz and Mr. Nichols-----	145
Prepared statement of Mr. Stein-----	153
Prepared statement of Mr. Ellis-----	160
Dunn, Paxton, Chief Economist, U.S. Council of the International Chamber of Commerce; Harvey Wallender, vice president, Council of the Americas; Marcus B. Finnegan, senior partner, Finnegan, Henderson, Farabow & Garrett; and Benjamin Sharman, international affairs representative, International Association of Machinists-----	65
Prepared statement of Mr. Dunn and Mr. Wallender-----	68
Prepared statement of Mr. Finnegan-----	75
Prepared statement of Mr. Sharman-----	124
Steuer, Dr. Guyford, Chairman, National Academy of Sciences Task Force on the National Paper; and Dr. Harvey Averch, Assistant Director, Directorate for Scientific, Technological, and International Affairs, National Science Foundation-----	81
Prepared statement of H. Guyford Steuer-----	84
Prepared statement of Dr. Harvey Averch-----	42

## ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

Adams, Hon. Brock, Secretary, Department of Transportation, letter with enclosures of February 2, 1978-----	276
Andrus, Hon. Cecil D., Secretary, Department of the Interior, letter of January 26, 1978-----	272
Bergland, Hon. Bob, Secretary, Department of Agriculture, letter of January 25, 1978-----	267
Bergold, Harry E., Jr., Assistant Secretary for International Affairs, Department of Energy, letter of February 8, 1978-----	260
Callfano, Hon. Joseph A., Jr., Secretary, Health, Education, and Welfare, letter of February 13, 1978-----	270
Can the American System of Graduate Education of Young Scientists Also Serve To Train Foreign Scientists to Effectively Address Current Technological Problems in Their Own Countries, article-----	266
Costle, Hon. Douglas M., Administrator, U.S. Environmental Protection Agency, letter of January 30, 1978-----	270
Ellis, William N., Tranet, letter of January 2, 1978-----	244



	Pag
Frosch, Hon. Robert A., Administrator, NASA, letter of February 16, 1978.	27
Godley, Gene E., Assistant Secretary, Legislative Affairs, Department of the Treasury, letter of January 30, 1978.	27
Harris, Hon. Patricia Roberts, Secretary, Housing and Urban Development, letter of February 3, 1978.	27
Hastings International and Comparative Law Review, article.	8
Jankowitsch, Peter, Permanent Representative of Austria to the U.S., letter and attachments of December 13, 1977.	18
Kokinda, Susan, legislative representative, U.S. Labor Party, statement.	25
Kreps, Hon. Juanita M., Secretary, Department of Commerce, letter of February 8, 1978.	20
Kurtz, Howard G., president, War Control Planners, Inc., letter and enclosures of December 7, 1977.	25
Marshall, Hon. Ray, Secretary, Department of Labor, letter of January 31, 1978.	2
McGee, Gale, Ambassador, Department of State, letter of December 14, 1977.	23
McGilfert, David E., Assistant Secretary of Defense, letter of January 20, 1978.	20
Nichols, Rodney, vice president, The Rockefeller University, letter with enclosure of January 3, 1978.	23
Orfila, Alejandro, Secretary General, Organization of American States, letter of December 14, 1977.	23
Policy Related Studies on Science and Technology for Development, article.	4
Reinhardt, John E., U.S. Information Agency, letter of January 16, 1978.	27
Smith, Jack M., executive director, The Stanley Foundation, letter and enclosure of December 2, 1977.	21
Stein, Robert E., director, North American Office, International Institute for Environment and Development, letters of December 20, 1977.	24
Willowski, Jean M., Ambassador, U.S. Coordinator, Department of State, letter of January 9, 1978.	15

## U.S. PREPARATION FOR THE 1979 U.N. CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

THURSDAY, DECEMBER 15, 1977

U.S. SENATE,  
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,  
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE,  
*Washington, D.C.*

The subcommittee met at 9:10 a.m. in room 5110, Dirksen Senate Office Building, Hon. Adlai E. Stevenson (chairman of the subcommittee) presiding.

### OPENING STATEMENT BY SENATOR STEVENSON

Senator STEVENSON. This hearing by the Subcommittee on Science, Technology, and Space is on U.S. preparation for the 1979 U.N. Conference on Science and Technology for Development. If the Conference is to be more than a forum for debate and confrontation, the preparatory process must determine priorities and address some very serious questions such as how can the transfer of science and technology between industrialized nations serve the interest of both; what assurances are required by the private sector to secure its active involvement; how can emphasis be given in the development process to what is called appropriate technology, to mention but a few.

The hearing demonstrates that Congress expects to play an active role in the preparations. We make no claim of knowing in advance how all these questions should be answered, but we do expect to be a partner in the exercise.

Senator Schmitt.

### OPENING STATEMENT BY SENATOR SCHMITT

Senator SCHMITT. Thank you, Mr. Chairman.

I welcome our witnesses today to what is, in my opinion, a very important area for discussion and for eventual resolution.

I might make just a few reflections on the issue of technology transfer—reflections that are related to my travels in the developing world as an astronaut where I had an opportunity to see their aspirations maybe from a slightly different perspective than normal; and to my concerns about a very critical problem in New Mexico and parts of the Southwest as well as in our major urban area—country, and that is the problem of illegal aliens. I think this is very clearly related to the central problem of the standards of living of the developing world and the world, in particular the United States.

Now, in these travels that I have had, in Central Africa and Southeast Asia and Latin America, there is very clearly a great respect for the technological capabilities of the United States. It is probably the only area where all people universally respect us. Whatever they may think about our other policies and actions, their respect for our technology is genuine. A large part of that respect has been generated just in the last 10 or 15 years as a consequence of what they and others in this world have observed about our activities in space.

They believe we have the capability to explore space, land on the moon and return, and in that belief they see hope for their entry into the technological 20th century.

If I heard it once, I have heard it a hundred times, individuals in these countries, and not the governmental leadership necessarily, but leaders of people in these countries say, "Don't send us dollars. Send us know-how. The dollars will go in the pockets of our leaders. The know-how will go into our minds."

I think therein may lie the key to the mechanism by which we, the United States, hopefully in cooperation with other industrialized portions of the world, bring these developing countries into the 20th century with us. In that process, we, I think, must distinguish very clearly between the transfer of technology and the transfer of the benefits of technology.

The distinction, I think, can be drawn by two examples. One, in the transfer of technology to produce more food, there is very clearly a need in almost every developing country of the world. They need certain kinds of technology, sometimes called appropriate technology. I am not sure I like that term, but that is what is being used.

On the other hand, when it comes to developing a communications system by which education can be carried out efficiently, then it is the benefits of technology that are going to provide the basic foundation.

The use of one satellite parked over Africa, for example, can provide all of the education communication capability that we have taken 100 years to develop in the United States through ground-based communication systems.

So I think if we continue to remember that distinction, some of our difficulties become simple. At least we will find, I believe, that different mechanisms can be utilized toward these two types of basic technology transfer.

We have already established at least one mechanism for the transfer of the benefits of technology, and I call the panel's attention to *Intelsat*, which is fundamentally an international organization that provides a mechanism for the availability of the benefits of communication satellite technology.

We have not done nearly so well in the transfer of the technology that is called appropriate technology—that which would relate to the development of job-intensive industries such as agriculture, health systems, and so forth.

So again, I welcome the panel to these discussions. I know the chairman and I both are very intrigued by the subject. We hope we can participate. Again, the mechanism by which we participate is not exactly clear.

Thank you.

Senator STEVENSON. Our first witnesses this morning are Hon. Lucy Wilson Benson, Under Secretary for Security Assistance, Science, and Technology of the Department of State; Rev. Theodore Hesburgh, president, University of Notre Dame, and chairman of the U.S. delegation to the U.N. Conference on Science and Technology for Development; and Hon. Jean Wilkowski, coordinator of U.S. preparations for the U.N. Conference on Science and Technology.

Our first witnesses appear as a panel. We welcome them. Please proceed.

**STATEMENTS OF HON. LUCY WILSON BENSON, UNDER SECRETARY FOR SECURITY ASSISTANCE, SCIENCE, AND TECHNOLOGY, DEPARTMENT OF STATE; REV. THEODORE M. HESBURGH, PRESIDENT, UNIVERSITY OF NOTRE DAME, AND CHAIRMAN, U.S. DELEGATION TO THE U.N. CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT; AND HON. JEAN M. WILKOWSKI, COORDINATOR OF U.S. PREPARATIONS FOR THE U.S. CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT**

Mrs. BENSON. Thank you, Mr. Chairman and Mr. Schmitt.

On behalf of our panel of administration witnesses, let me say how much we welcome the initiative your committee has taken in convening these hearings on the United Nations Conference on Science and Technology for Development.

We are in the early stages of preparation for that Conference, which is still nearly 2 years ahead of us. However, I want to emphasize that it is precisely at this initial stage that we are most anxious to encourage congressional interest and to solicit congressional guidance.

In our opening statements today we plan to deal with the background and purposes of the 1979 Conference, with preliminary views of the U.S. objectives at the Conference, and with the current state of U.S. preparations.

The U.N. Conference on Science and Technology for Development should be looked on as an extension of a series of world conferences on global problems stretching back to 1972—conferences on the human environment, on food, on population, on habitat, on water, and on deserts.

The Science and Technology Conference represents an effort to examine systematically how science and technology can best be employed to accelerate human development and promote human welfare. The purpose is to explore how best to harness science and technology to the process of socioeconomic development.

The preliminary guidelines developed by the United Nations Secretariat include the following objectives:

The building or expansion of science and technology capabilities of their own in developing countries;

The selection of technologies most appropriate to the resources objectives, and values of the individual developing country; I am sure you are familiar with our own interest in this area and the establishment last year of "Appropriate Technology International" under AID;

The creation of institutions in developing countries which will insure that science and technology are brought to bear in formulating national development plans;

The development of more rapid and more complete exchanges of science and technology, and information and experiences relevant to development, along the lines of the information network currently being designed by the Office of Science and Technology of the U.N.;

The encouragement of research and development on problems of particular importance to developing countries, such as the work done earlier by a network of research institutions in fostering the "Green Revolution."

These guidelines are obviously very general; the job now is to translate these and other goals into specific proposals that can be pursued with a realistic chance of working.

I would like to stress the importance of this preparatory work. This Conference should not be seen as a single, one-time event in the late summer of 1979. It will be, on the other hand, the culmination of a 2-year process of preparations, involving a number of stages. The one immediately at hand is the preparation of so-called national papers, which are intended to review the performance of each participating nation—on the policy and technical levels—in applying science and technology to development. The national papers are intended to examine national interests and needs, resources and capabilities, and past successes and failures.

A major aim of the preparatory process is the identification of a discrete number of subjects—a maximum of five—for discussion at the 1979 Conference. This begins with the national papers. There also are regional meetings under U.N. auspices, which have already begun, in Africa, Latin America, East Asia, West Asia, and Europe. The preparatory committee, at its meeting in Geneva early next year, will seek agreement on the five topics for inclusion in the agenda of the Conference.

As you know, U.S. development policy gives priority attention to meeting basic human needs—food, nutrition, health, population, low-cost housing, and energy. We will work to have the Conference focus on these same basic human needs. We also will want the preparatory work and the Conference itself to focus strongly on means of strengthening the infrastructure which developing countries need to generate and sustain their own scientific and technological capabilities, to help them reduce their scientific and technological dependency, and to increase their productivity.

Because of the importance we attach to this Conference, we have made a special effort to secure the services of outstanding individuals to lead our delegation and guide our preparations. We are particularly pleased that we have been able to enlist Father Hesburgh as head of the delegation. The respect he commands—at home and abroad—is an asset that I don't think we can exaggerate. We are delighted he agrees he must be involved from the outset of our preparations—and he is already making his influence felt. We are delighted also that an experienced, senior career diplomat, Jean Wilkowski, has taken on the challenge of being coordinator for the U.S. preparations. The fact that both have been given ambassadorial rank for these assignments is a small sign of the importance we attach to the Conference.

Mr. Chairman, we hope that the exchange of views beginning this morning will be continued in greater depth as we prepare for this Conference throughout the next 2 years.

We would like to encourage participation of a few close advisers from both sides of the Hill to whom the coordinator's office could look for experienced and specialized advice and assistance on a continuing basis.

We look forward to having Members of Congress and their staffs on our delegations to the international meetings called for in the preparatory schedule set by the U.N. as well as in the Conference itself. If feasible from the congressional side, we would like to consider the possibility of including some members and staff in some of the bilateral consultations.

And it is always possible that our preparatory work will need legislative support—actions, for example, to encourage U.S. academic institutions to expand linkages with, and enhance the capabilities of, developing countries' research institutions. In such cases we want to consult with Congress sooner rather than later.

Until domestic studies, policy reviews, and public debate have matured, it is too early to talk in terms of specific initiatives for the U.N. Conference on Science and Technology for Development. But there are many possibilities beginning to take shape in the minds of those concerned with the Conference. Let me just mention two examples:

A comprehensive program whereby the focus of American research and development activities is broadened to cover more problems of immediate relevance to the Third and Fourth Worlds, and whereby American institutions join more fully in building or strengthening indigenous capabilities in the developing world.

The establishment of some mechanism whereby the U.S. Government can play a role in extending various forms of scientific and technological assistance to middle-income countries.

Let me stress that these ideas are offered not as formal suggestions but as illustrations of initiatives which might eventually require congressional support. We therefore want to engage the Congress at the outset in their development.

Mr. Chairman, we look forward to advice and guidance from you and members of your committee at this stage and as we get more deeply into our work.

Thank you.

I would like to introduce Father Hesburgh who is our next witness.

Ambassador Hesburgh. I have been asked by many people why I accepted appointment to head the U.S. Delegation to the United Nations Conference on Science and Technology for Development. My answer is very simple.

First, I believe this Conference can make a truly important contribution to the emergence of a serious and cooperative attack on the global menace and human disgrace of world poverty.

Second, I am certain that the United States has more to gain from such an effort than any nation in the world, and I am equally certain that the United States can make the greatest contribution to it of any other nation.

And third, I am convinced that the present administration understands the scale of opportunity and the urgency of the challenge and will do its level best to insure a successful outcome from this Conference.

If I am right on these points, I could not refuse to serve and continue to live with my conscience.

In any case, the whole enterprise appeals to me because the goal of the conference is to improve poor people's lives by finding the best ways of bringing the benefits of science and technology to them. And I've never seen science as a menace. I've always seen it as an enormous opportunity, especially when turned into technology and made available to people to do things never before possible.

I think the challenge now is to take the enormous potential of science and technology and somehow to put it to peaceful uses, to constructive uses, to developmental uses, and to make it possible for the first time in the history of mankind to do away with absolute poverty that breeds hopelessness and turns the ideas of human dignity and of human rights into cruel illusions. To give those people in the developing world who still are in absolute poverty a chance to learn to read, to have a job, to eat better, to drink clean water, to give people the hope that their children will know a more just and more humane world; this is the challenge before all of us. We must bring science and technology to the service of these simple goals.

As for the more specific objectives of the United States, they can be stated as follows:

First: It is in the U.S. national interest to join with the other industrial countries to use the conference as a major vehicle for attacking poverty, and to undertake a concerted new effort to apply this country's special capacity in science and technology to the direct problems of the developing countries. We should do this because:

It is in keeping with the humanitarian element of our foreign policy;

It will contribute to world peace, order, and justice; and

It will enhance our image as a responsible world leader, with the political will and humanity to share our skills and knowledge, for the benefit of others.

Second: It is in the U.S. political interest to use the Conference toward several ends:

To deepen and expand industrial country cooperation on our respective policies on science and technology for socioeconomic development;

To nurture and strengthen the North-South dialog, a matter of global welfare if not survival;

To minimize, if not remove, mutual distrust and suspicion from this dialog;

To create a positive and constructive environment for a common approach to shared global problems where science and technology can be a critical force for change;

To demonstrate our continued support for the U.N. as an appropriate and convenient forum for such a dialog;

To clarify and improve the role of science and technology for development in our own foreign policy so as to be in a better position to encourage more realistic science and technology policies in developing countries; such parallel reevaluation of policies would recognize that development is basically an indigenous phenomenon;

Finally, it is in the political interest of the United States to back up our rhetorical support for scientific and technological development by conscious recognition and practice of true interdependence within the global community.

Third, U.S. economic interests are served by assisting developing countries to improve their scientific and technological infrastructure, and develop an indigenous capacity to select, adapt, and manage technology:

The United States depends on the developing countries as a market for 36 percent of its total exports and as a source of nearly 50 percent of its imports, many of these vital to our national security and economic well-being;

The Conference can be an effective mechanism to acquire new trade and investment opportunities for American industry, as well as uncover new opportunities for American educational institutions and research foundations.

U.S. preparations for this Conference must be viewed within the general context of this administration's desire to expand the range of our foreign assistance with major focus on meeting basic human needs.

This is one of those open windows in history when a series of developments combine to make change possible on a scale normally not within the realm of possibility. President Carter has committed his administration to shaping a world order that is "just" and "more responsive to human aspirations" as well as stable and peaceful. I am honored to be part of this extraordinary opportunity. I hope—and will work to assure—that America responds, for reasons of both self-interest and humanitarian concern, in a manner which is equal to this opportunity. If we do, the year 2000 could bring a different and better world for mankind.

Ambassador WILKOWSKI. Mr. Chairman, Senator Schmitt, we turn now to actual U.S. preparations for the 1979 Conference. These began a year ago in November 1976, when the Secretary of State convened a meeting of nearly 700 interested parties in Washington, from U.S. industry, labor, universities, U.S. trade and professional societies, private voluntary organizations, research institutes and foundations. The result of this initial action is an impressive roster of people and institutions willing to host workshops, undertake studies, consult on policy options, and offer their experience and services generally.

Preparations were resumed on a full-time basis when the Coordinator's office was opened 5 months ago. The office is attached at the policy level to the Under Secretary of Security Assistance, Science and Technology. The Bureau of Oceans and International Environmental and Scientific Affairs has primary responsibility for substantive support.

The Bureau of International Organization Affairs has near equal responsibility for supporting the Coordinator's office. In addition, the Coordinator's office receives support from the Bureau of Economic and Business Affairs, the Secretary's Policy Planning Staff, the Bureau of Intelligence and Research, and the geographic bureaus, especially those bureaus dealing with Latin America, Africa, Near East, and Asia. The Coordinator's office will rely heavily upon AID—particularly its Bureau for Development Support, the former Technical Assistance Bureau, and it was reassuring that AID was among the



very first agencies to express its desire to be supportive of our preparations for the Conference.

In our initial stage of operation the Coordinator's office has also received personal interest and support from the Secretary of State, and from the National Science Foundation, and the Office of the Science Adviser to the President. The Secretary of Agriculture has expressed his interest, and we have established liaison with that agency and many others in the Government such as Commerce and its Bureau of Standards, Department of Energy, and NASA. In addition, this office has established links with leaders of the Congress, such as the chairman of the Senate Subcommittee on Health and Scientific Research, the chairman of the House Committee on International Relations, and others.

The administration looks to the Coordinator's office for leadership both within the Washington bureaucracy and the private sector to stimulate national interest and support, contract for studies, bring U.S. Government task forces and interagency panels into being; in sum, to coordinate a national assessment of this country's resources and capabilities and to outline policy options and recommendations for the U.S. position at the Conference.

This office is also responsible for liaison with the office of the Secretary General of the Conference at U.N. Headquarters in New York. In addition, we will be part of the U.S. representation at various regional preparatory meetings throughout the world and bilateral U.S. consultations with both developing and industrialized countries.

The support and cooperation we have received thus far has been highly encouraging.

In reply to the subcommittee's request concerning staff, I am happy to report that our staff is now in place; myself, five other officers, three secretaries, and a student intern. This is adequate for the present.

In our approach to the Conference, we have taken account of the reality that the bulk of American know-how in science and technology is in nongovernment hands. This has led us, particularly in these initial months, to reach out to the private sector—to engage the wealth of experience, knowledge, and expertise that exists there.

Let me offer some specific examples of what we are doing. Groups from industry, labor, academic foundations, and Government have given guidance on the objectives that the United States should pursue at the Conference, and we are continuing contacts with them.

While writing of the national paper will be the responsibility of a small governmental task force, we have contracted with the National Research Council for a background study of U.S. resources and capabilities which could be applied to the priority needs of developing countries. The committee will hear later in the day directly from the director of the National Research Council study, Dr. Guyford Stever. The arrangements we have made for the NRC study stem in part from our interest in engaging the best minds of the nongovernmental sector to help clarify the issues, goals, and criteria to be used in setting U.S. priorities.

We have also entered into a contract with a consortium of the Fund for Multinational Management Education, the Council of the Americas, the U.S. Council of the International Chamber of Com-

merce, and The George Washington University to organize a series of meetings throughout the United States. This will bring in the experience of approximately 200 American business firms, largely having interests in Latin America. They are identifying incentives and constraints, on both the developing country side and the industrialized country side, which affect the development of scientific and technological capabilities in developing countries. We propose to test the general validity of their conclusions by holding additional workshops with other business groups such as the Conference Board, the Industrial Research Institute, and chambers of commerce throughout the country.

The consortium has, for instance, learned that many U.S. firms would like to see an expansion of the ability of the Overseas Private Investment Corporation to provide insurance coverage for private technology transfers to the developing countries.

This is just one of the ideas they have come forward with in the early stages of their work. We have worked closely with the National Science Foundation in setting up a program for soliciting nongovernmental studies directly related to items on the Conference agenda. Recently, we have met with the National Association of State Universities and Land Grant Colleges. This group is preparing a proposal to explore some of the lessons learned from their long experience in helping developing countries train their own professionals and build their educational institutions.

We have discussed with the Engineers Joint Council various projects, including the setting up of engineering extension services for remote developing areas, systems for improving engineering education in the developing countries, and a foreign engineering students' seminar to focus on technology transfer. The Licensing Executive Society has suggested that the United States and the U.N. bring foreign businessmen here to be trained in U.S. corporations on licensing procedures.

We are exploring with the Aspen Institute a workshop on agribusiness which could help us understand policy options in that area.

The coordinator's office itself plans to sponsor a series of workshops and seminars to be held in the year immediately preceding the 1979 Conference. These will enable us to engage in national debate on some of the conclusions of the NRC and other studies for a clearer consensus on policy positions, once there is agreement on the Conference agenda. We hope that Members of Congress will participate in these events, especially in their own States and congressional districts.

In the course of expanding and deepening links in the private and public sectors, we hope to find answers to a number of questions, such as:

How to help the developing countries improve their capacity to choose, adapt, use, and manage technologies;

How to engage a larger proportion of American research and development in agricultural and industrial problems of the developing countries;

How to increase and strengthen R. & D. capabilities in developing countries;

How to establish and expand professional societies and organizations in developing countries;

How to improve the relevance of science and technology training given to developing country students in the United States; and

How to increase and improve linkages, between U.S. educational institutions and those of developing countries.

The foregoing is in essence a 5-month progress report. We hope, Mr. Chairman and Senator Schmilt, to have an opportunity to report on additional progress in coming months.

Mrs. BENSON. Mr. Chairman, this concludes our testimony on the initial phase of U.S. preparations for the United Nations Conference on Science and Technology for Development. As all three administration witnesses have indicated, the United States wants to participate and play a leading role at this Conference. We believe it is in our national interest to do so.

Together with other industrialized countries, we face increasing complexities in the north-south dialog. What science and technology can do for socioeconomic development in the poorer nations of the world has never been put to a hard policy test, but this can and should be the central theme of this Conference. With the necessary political will and realism on both sides, this Conference can go far toward meeting the objectives of both industrialized and developing nations and provide mutual benefits for both sides.

For the U.S. contribution to be successful will require congressional involvement and support beginning now and continuing throughout the next 2 years as well as thereafter. That is why we are grateful to this Senate subcommittee and to you personally, Mr. Chairman, for the opportunity to come before you today and review our plans and progress.

We will be happy to answer your questions.

Senator STEVENSON. Thank you, Mrs. Benson. We are grateful to all of you. You have identified the challenge and the opportunity of this Conference eloquently and described your preparations. The offer of cooperation with Congress is also most welcome.

Do the earlier conferences help to establish a consensus on priorities for this Conference?

You, Mrs. Benson, suggested that we ought to identify a maximum number of five priority subjects.

I suspect that there is a widely held concern that this Conference could bog down into debate, much of it highly rhetorical, over the new international economic order. A confrontation between the north and south over this issue is of much concern. There is some experience to indicate that such concern is not entirely unwarranted. Four or five conferences have preceded this 1979 Conference.

Masses of resolutions have been introduced and debated. From those conferences, can you perceive, not from your standpoint alone, the priority subjects for consideration among the countries who will participate in this Conference?

Mrs. BENSON. Senator, and Mr. Chairman, you are quite right in airing these concerns. We are concerned in the same way as you just outlined. I think there is every possibility that we will have difficulty in getting consensus in the first place and keeping that consensus not only on the major areas to be covered, but also on what other views may be aired at the Conference. I would like to ask both Father Hesburgh and Ambassador Wilkowski to comment on this. It is probably too early to know whether we will have consensus. There is consensus, but there is still a lack of focus in the group of 77. I don't

think they have really gotten down to setting priorities in a realistic way. They are interested in a huge number of things and a huge number of concerns, but let me ask first—

Senator STEVENSON. Let me say at this point, unless I indicated otherwise, and subject to the appropriate degree of State Department protocol, my questions are addressed to all three of you. I would hope we can hear from whoever is the appropriate individual.

Ambassador HESBURGH. Mr. Chairman, I don't think anyone who has followed the so-called mega-conferences on environment in Stockholm, or population in Bucharest, or the meeting in Vancouver, or Law of the Seas in Geneva, or the conferences in Argentina and Nairobi, the Women's Conference in Mexico City—all of these conferences have focused on a specific part of the total agenda before the world.

It would seem to me that this particular conference on science and technology for development could draw on all of the conclusions from the other conferences and bring the whole matter to a head. I don't know how you get beyond mega-conferences, call it a mega-mega maybe. It seems to me this conference in a real sense, if well planned, and if we develop a certain amount of consensus in the developing and industrialized worlds, could get on with an agenda that would be tremendously rich and important. We have a nice goal ahead of us at the beginning of the next millennium and we have a couple of decades of movability here before the next millennium begins.

I think the actual science and technology is probably all developed at this point. I think what we need over and above that is how we bring it to bear on the basic human problems—I mean really freeing mankind from some of these problems. Over the next few years, more important than the Conference itself, will be the getting ready for the Conference.

The agenda should not be just rhetorical, but should get down to the nitty-gritty of what must be done in the world's agenda.

To have justice and peace, we need some kind of economic, social, and human order which makes sense, if you have the kind of vision in mankind we profess.

For my own purposes, I found Amuzegar's article in the October issue of *Foreign Affairs* a good statement of what we face. In one sense, there is a highly utopian desire on the part of developing countries for everything, including the latest in technology and a kind of reticence on the part of the developing world to change what we have now—the condition under which technology is transferred, the problem of private versus proprietary technology, and a whole spate of other problems. Somehow we have to shake ourselves a little loose with regard to these problems.

On the other hand, we have to somehow bring the developing world beyond the utopian into the very practical: Where do we begin to get to a kind of development far above that which we have today?

For me, the ultimate goal would be, in the first instance, to get rid of absolute poverty in the world.

We can do that now. We have a means of doing it. We are the first generation of mankind that has the means of doing it. We can get rid of absolute poverty. I am talking about the 40 countries of the so-called Fourth World who live between \$1 and \$100 GNP per family per year, who somehow don't have the oil and the ores as resources for development and are completely without hope today.

I think we have the means without enormous expenditures of money, of enabling them to help themselves. Science and technology are very much a part of that. Beyond that we have, of course, to move forward to the goals of development for the Third World, generally.

I am very confident we can be successful if we can do one thing: Generate the political will, not only our own, but in the whole world to set out realistic goals and move toward them with realistic means. That is not easy, but I think it is the challenge that faces us.

Senator STAVENSON. Ambassador Wilkowski, can you perceive from the work of the preceding conferences that the agenda for this conference will be the development of the Third World and eradication of poverty? The stated agenda appears to apply to other things, energy, production of food, and habitats. What are the global priorities, that have been identified from the work of the preceding conferences, which might form the basis for this conference?

Ambassador WILKOWSKI. Let's just focus on energy, for example. Right now, the entire world is concerned about the energy problem. I see this conference as one which will be useful in looking at world problems in which we all have a direct interest and where we can try to find shared approaches to shared problems. I think energy is one of these. We are increasingly reliant, as we all know, on imports for our own petroleum needs. We are very much concerned about alternative sources of energy. We won't, in this Conference, be looking for new scientific and technological processes as such, as much as we are looking for how we can share what we already know in scientific technology and technological processes with other countries. We have to look at the constraints to this flow. This Conference is really about political will, an action program. In response to your interest in what has gone before, I would note that there was a conference held in Geneva in 1963 on science and technology and its application to developing countries. It was a case of scientists talking to scientists. That conference did not become an action program.

We hope that there will be the political will on both the part of the industrialized countries and developing countries to create an action program here in which each of the parties to this Conference—when I say each, I am speaking of two groups, the industrialized countries as one group and the developing as another—each of them will examine very carefully their own policies.

What is, for example, the U.S. policy on science and technology for development? What kind of policy is it? How should it be articulated? Is it in our national interest? It is hoped, as well, that the developing countries will look at their policies to see what weaknesses exist. The weaknesses on both sides are, as Father Hesburgh said, unfortunately adversely affecting the lives of the people in our countries.

What needs to be done is to find ways in which we can institute action and programs which could correct this situation.

But I should like to also speak a little bit to the question alluded to of the atmosphere for this Conference, the so-called north-south dialog.

As Father Hesburgh said, a very good insight on that is obtained from the article by the Iranian authority at the International Monetary Fund. We hope this Conference can contribute to improvement in that atmosphere; and the United States intends to take a very posi-

tive and constructive stance, as it approaches this Conference; and we would hope that our leadership and our attitude would be, if you will, infectious and that other countries will make a similar position.

Thank you, Mr. Chairman.

Mrs. BENSON. Mr. Chairman, can I add to that?

This problem of deciding what we are going to do and how we are going to do it, has an institutional side which hasn't been referred to yet. I am witnessing right now U.S. governmental institutional problems in connection with a followup meeting of a variety of our Federal agencies on the water and desertification Conferences held earlier this year: a Conference on water in Argentina in the early spring and a Conference on desertification in Nairobi in August. We went to those conferences with a list of things we were prepared to do, which we talked about at both conferences. While we were there, we picked up some more ideas about things that we might do. Each of those delegations came home with the list they went with and the list they developed. Our institutional problem is the difficulty of getting our Federal agencies to work these things into their budget between now and the foreseeable future.

One thing we need to do in connection with this U.N. Conference is to start now to think in budgetary terms, what the conclusions of this Conference may mean for the U.S. budget following the 1978 Conference.

We may go in and come out of the Conference with a lot of ideas. But by that time the budgets for 1981 and 1982, will be beginning to set in concrete.

This is an important institutional problem that involves both the Congress and others.

Senator STEVENSON. I was coming to that next.

In particular, since Ambassador Wilkowski has mentioned the subject of energy, is the Department of Energy participating in the Conference preparation? Because their involvement must be reflected in their budget, I would think it imperative that DOE be involved now in the preparation for the Conference.

Ambassador WILKOWSKI. We haven't made any contact with DOE on this. Let me say, they participated in the November 1976 meeting the Secretary of State called.

As a result of that meeting, they provided us with an extensive statement on what it is they thought they might do for the 1979 Conference.

We have since met with representatives of DOE, had two or three meetings with them and told them what we plan to do and how we want their support on an interagency panel.

This interagency panel will be coming into being very soon in the new year and yes, they will be much more actively involved in the new year than so far in our initial contacts with them.

Senator SCHMITT. If the chairman would yield, would you also comment on OMB, Office of Management and Budget? Are they involved?

Ambassador WILKOWSKI. We have not had direct contact with them yet. We have talked with Science Adviser to the President Dr. Frank Press, and I believe he has had conversations with them, but we have not yet.

Senator SCHMITT. Have you tried?

Ambassador WILKOWSKI. No, Senator Schmitt, we have not yet tried.

Senator SCHMITT. I would suggest that you try.

Mrs. BENSON. We will.

Ambassador WILKOWSKI. Thank you for the suggestion.

Senator STEVENSON. Let's mention a few more departments. Agriculture?

Ambassador WILKOWSKI. Yes. Secretary of Agriculture wrote the Secretary of State a long letter saying how he very much wanted to be involved in this. I tried to call on the Secretary and was referred to one of his Deputies, Dr. Rupert Cutler.

We have had meetings with Mr. Cutler and his staff, and I have asked them to plan for taking the leadership on the interagency panel, and they are standing by waiting for guidance from us.

It sounds as though we are going very slowly with these agencies, and I don't mean to apologize for it, Mr. Chairman, but what we have attempted to do was give a certain priority to our outreach to the private sector. We have, as you know, organized a rather massive study with the National Research Council, and this was no small amount of doing, but we thought, given the degree to which technology resides in the private sector, that it was terribly important that we get the private sector on board as soon as possible, and much of our initial energy in these first 5 months has been with the private sector, but we have not ignored the public sector.

We have had any number of discussions with the Department of Commerce. I believe very soon after the new year we will have the interagency panels in place.

Agriculture tells me they have done a lot of work themselves.

Senator STEVENSON. I certainly wouldn't want to diminish or downgrade the importance of involvement from the private sector, but it is not part of the Federal budgetary cycle. Those other agencies are, and their commitment in their own budget, I would expect, would depend very heavily on how actively they get involved early in this Conference preparation process.

I won't exhaust this whole list. I could mention others, HEW, NASA.

Ambassador WILKOWSKI. We have had contact with HEW. And NASA, we have talked with them as well.

Will you have witnesses from these agencies because I think they can speak better about what they have been doing. I am sure the Department of Agriculture would be well prepared, the Department of Commerce as well, and AID.

Senator STEVENSON. We have had contacts with several agencies. We will follow up. Possibly this is an area in which we can be of some help. If there is any foot dragging in any of these agencies, it certainly would be appropriate for us to keep the heat on.

We will be in touch with them.

Ambassador WILKOWSKI. Mr. Chairman, I wanted to say, there is no indication of foot dragging at all. On the contrary. There is a great deal of enthusiasm to be a part of this and to protect the interests of the individual agencies so we have had cooperation from them.

Senator STEVENSON. Now, in preparing for the Conference, are there other consultations with other governments? Are the industrialized

countries, for example, trying to help identify the subjects for discussion and action in this Conference?

Ambassador WILKOWSKI. Yes, Mr. Chairman. I would guess that we have had contacts with over a dozen, 12 to 15 representatives of foreign governments right here in Washington, and we have consulted with a number of their science attachés.

They called me just the other day and asked me if I would speak at their monthly luncheon with science attachés of various governments. We had discussions with the German Government, Canadians, Mexicans, and Brazilians to name a few.

We have also encouraged the Bureau of Cultural Affairs to go ahead with a seminar here of leading representatives of other countries who are working on their country paper in their preparation for the Conference and there is an exchange group of 27 distinguished visitors, over half of them members, or coordinators themselves.

We had extensive talks with them. They met at the National Academy of Sciences, National Science Foundation, various Government agencies and toured the United States. Members of my office attended their wrap-up session at George Washington University, where they indicated exactly what they thought should come out of this conference.

Soon in the new year we intend to embark upon a program of bilateral consultations.

Senator SCHMITT. I found the testimony of the panel extremely interesting.

Dr. Hesburgh, I was particularly fascinated by your statement which almost identically reflected the thoughts that I have had about the opportunity for creating at least the light at the end of age old problems that have faced mankind such as hunger, poverty, disease, ignorance, and being able to communicate with each other.

I agree with you completely that we are the first generation that can see light, legitimately see light at the end of the tunnel. The opportunity is unique and it is one which I hope this country grasps, as I am sure you do also or you would not have volunteered for what is going to be extraordinarily difficult service.

I would like to separate again in my questioning, if I can, the idea of technology from the idea of benefits of technology.

I think the latter issue is more easily treated because we at least have one example of how nations throughout the world have already begun to cooperate, and that is in the Intelsat system.

Do you see an opportunity here for other types of management systems that could provide the benefits of technology? Earth resources is one that very clearly has been in the minds of this subcommittee, and we think that there probably should be an operational earth system, Earthsat, if you will, organized along the line of the model of Intelsat.

Would you like to comment?

Ambassador HESBURGH. Senator, perhaps the most striking example of this kind of cooperation which is already in place and operating is the setup for agriculture around the world, research in agriculture in developing tropical areas particularly.

As you know, it began with the International Rice Research Institute in the Philippines. Even during World War II the Rockefeller Foundation was working in the growing of new strains of hybrid



corn and wheat in Mexico. They have international wheat and corn centers there.

There is a center for international tropical agriculture in Colombia. Another one, in Nigeria, and one on arid lands in Hyderabad, in India. There is one on raising of livestock and the various diseases attending that in Nairobi.

That is the newest of the linkage. All of these are tied together in kind of consortium where every bit of new genetic stocks developed is tried out in 80 different countries, so they can have it right in their genetic systems, climate, temperature variations, the kind of variations in water available, and fertilizers and all the rest.

The result of this is, we can realistically say today, if we really put our minds to it, we can move agriculture ahead by geometric progressions, if you will, by putting in the new genetic studies. Nitrogen fixation, as we discover ways of doing it, offers the way to get at the caloric content of various foods, to make them enriched that way. It could be similar to the opaque gene that was put into corn and multiplies many times its nutritional value.

There is just a wide, wide spectrum of work throughout the whole category of what you might call agriculture development going on.

Now, the problem is, this isn't just a technical problem. Just for illustration, there is a new organization being set up called the International Agriculture Development Service. This is trying to build a linkage between these great research developments on the one hand and what a country must do to make these become a reality for the small man because 70 percent of the world's population in the developing countries are in small farms, living in rural areas and they are a long way from technology and even the use of the benefits of technology.

We have to get a linkage there and we have to get government to see that it is not just enough to have the technology available. It requires some kind of land reform. The farmer has to see some result from his effort. Our own farmers are telling us that right now.

We have to somehow get into market availability, roads of access, the whole question of credit for the whole farming community around the world, the kind of planning for the best crops, for the best result and for the best needs of the country where the food is being grown.

In other words, we have to help people help themselves, but this requires more than just technology. It requires social development. It requires a certain kind of legislation, action on the part of the countries involved. It requires a whole new approach to the farmer so he may reap the benefits from being a farmer.

It is just a very complicated question that is being dealt with on an international basis right now through the World Council, AID, through the whole network of research organizations around the world. It is being approached cooperatively, independently and I think there is great hope for the future.

You can say the same thing for other areas but that will suffice for the moment.

SENATOR SCHMITT. That is a very impressive dissertation, Father. I would hope that area you described so articulately might be considered one of the points that could be pushed at the Conference, not only how do you expand the efforts already underway, but how do you develop this linkage.

Ambassador HESBURGH. The linkage is terribly important.

Senator SCHMITT. That is something I think every nation could immediately focus on, because you are dealing with reality, you are dealing with strains of crops that could be beneficial in a particular situation and the countries then in the Conference could focus immediately on the establishment of these institutional linkages that make it possible.

Somebody was telling me that, for example, the rice strains that were developed in the Philippines were great but were not readily accepted by the people in Southeast Asia.

Ambassador HESBURGH. That is true.

Senator SCHMITT. Now, possibly, another focus could be providing an operational job balance system by which the agricultural environment and other resource environments could be sensed.

Again I am back to the possibility of an operational earth resources satellite system. We have found in our initial hearings on such a subject in this subcommittee that there was a reluctance on the part of the administration to endorse such an activity. Do you think that this might form another point that could be focused on at the Conference?

Maybe Mrs. Benson can answer.

Mrs. BENSON. Yes, Senator, I think it is certainly another area for which we can focus. I am not aware of all of the sources of lack of U.S. Government enthusiasm for this as you referred to, but I know there is a considerable amount of difficulty in securing the cooperation of many of the less developed nations in joint ventures of this kind at the present time. It is something we need to work on.

The law of the sea experience is a good example. Ocean research is terribly important for the benefit of the world and in particular the less developed countries point of view, yet there has been a good deal of difficulty in getting cooperation of less developed countries to allow research inside their ocean borders.

The same is true of air space. This is something we have to work on because I think part of the problem of the less developed countries and of this conference is breaking down something which is very age-old in political terms but has just hit the newer countries, that is, a feeling of possessiveness about everything around their borders, up and down and out as it were. So this is going to be a problem of developing a cooperative attitude among all of us. I think that is a major political problem. There is no reason at all why the general idea you outlined isn't a good thing to concentrate on.

Senator SCHMITT. Well, I would recommend that your group look at the history of how that came to be. Had we followed the process in the development of the Intelsat system that we are following in the law of the sea, we would never have Intelsat.

You might say it was an accident but we apparently picked the right way to do it. To this country's everlasting credit it was our initiative that established, what Dr. Delbert Smith has called a technological imperative, in those countries with the greatest immediate need for the technology. Intelsat has since expanded to include the developing world and something many of those countries feel, I would say all of them, feel they can't live without.

Lebanon, even at the height of their activities, that station stayed on the air 3 days of that terrible affair in Lebanon.

So maybe we need to reorient and try to approach other problems, such as deep sea resources, in the same manner. This has occurred to me in the past, and we have talked about this in the whole committee, about the possible alternative applications of the same kind of operational imperatives. You set up the organization based on those nations that have immediate availability of technology and immediate need for the resources, technological or actual. That organization, can then be expanded and used as a framework to include the developing world.

So again I would recommend that this alternative be explored, as another example where, because of the existence of an operational model, we might be able to make progress very rapidly.

Ambassador WILKOWSKI. Senator Schmitt, I merely wanted to say we had initial talks on this. I met with Ambassador Elliot Richardson about the deep sea resources you mentioned. He is very interested in this Conference and the interconnecting links between the two conferences.

I have also had discussions with some of the sea-grant colleges, Texas A. & M. in particular has made a proposal, which we are studying. Normally the proposals are reviewed by us, by AID and are sent to the National Science Foundation for review.

We have scratched the surface there, but not the depth which you are recommending and we thank you for the suggestion.

Senator SCHMITT. My only concern is that if we continue along the lines of the law of the sea, to take that specific example, then I am afraid we won't get there from here. That trend of discussions is not along the line that would have developed the Intelsat or any other system broadly utilized and managed by the world community.

Let's make the record clear. Intelsat is not a system dominated by the United States. We do not even have a majority vote in it. It was an evolutionary process but one in which we participated in. It is an international management organization. It is extremely encouraging in that regard. I don't think we should draw away from that particular experience.

Mrs. BENSON. I quite agree, Senator. Far from drawing away, I think we ought to run in that direction rather than walking.

Senator SCHMITT. I am happy to hear you say that. I hope in this next session of the Congress, when we again talk about a specific example of an operational Earth resources satellite system, that the State Department and the administration will reexamine the reluctance with which we were greeted when we first began discussion of it this year.

Now the more difficult area is the transfer of technology that really provides the basis for doing what Father Hesburgh has asked, and I think all of us hope to do, to remove poverty, hunger, and disease and ignorance from the developing countries. Has or would the State Department in its discussions with the private sector explore the possibility of encouraging contracts between individual institutions, or a consortia of institutions, that would provide the transfer of services, the transfer of technology?

What I have in mind is purely a service contract, financed in a variety of ways, either through direct aid by this country but more desirably through international finance institutions or by the country itself. Has this been discussed?

son. Yes. We have discussed it. We would explore it, and much in favor of exploring it. There are a number of difficulties.

Like Ambassador Wilkowski to speak to this, and also from AID is here and I think could add more to it.

For WILKOWSKI. I met just this week in fact, Senator Dr. Fred Harrington, former president of the University, who is in the process of organizing a council of diversity and academic networks—seven major networks in whose of meeting with him was precisely to explore the type you mentioned. Perhaps Mr. Eilers of AID, who has us, can report on what has been done before. Incidentally, here is an example without laboring on it of another in which we have been working with closely.

Eilers would care to come forward from AID, maybe he Senator Schmitt's question.

is. For a number of years, Senator, AID has been contractor of U.S. private companies and institutions. For example, the last 5 years, we have employed the Denver Research Division of the University of Denver, to provide extension technology linkage services to counterpart industrial research in about 30 or more developing countries.

Each has involved a variety of techniques: Sending American R. & D. management, and technical specialists to work in countries with counterpart industrial research institutions; sending their people to work at the Denver Research Institutes alongside our own specialists; and responding to requests from such institutions in developing countries to solve specific technical problems.

A comparable contract with Georgia Tech to work on rural development. The Economic Development Center at Georgia Tech; small grants when appropriate to help the rural industries in developing countries. In many other ways, too, we share Georgia Tech's expertise and technology with these

around a dozen similar contracts from our office with U.S. and other private institutions.

SCHMITT. Let me give you a somewhat more massive example—Nigeria, with which I have some familiarity, was, as I know they are, the development of a national highway system that would allow the distribution of the food that they grow. Hopefully, along the lines of Father Hesburgh's discussion, can grow much greater quantities of such food resources. It would be to develop a national highway system that would allow distribution of such resources.

That is a project that would take many, many years to complete. It would be possible to negotiate a contract between a large engineering firm, expert in this area, and Nigeria, with the participation of the State Department. Such a contract could be a foundation by which Nigeria could carry on with the development of such highway system, and would terminate at the end of the project. It would further require that the country's indigenous engineers be trained to carry out the work?

At the end of that time, presumably if it's successful, Nigeria would have the nucleus for a highway system that would develop in the future. Has that been considered, and would the State Department ever consider such an operation?

Mr. EILERS. I can speak only for the foreign assistance program. What you propose is entirely feasible within AID, but it depends on a number of things. I think Nigeria is a good example, because it's a middle income country and does not have a concessionary aid program at present. Another division of AID is chiefly concerned with Nigeria: the Reimbursable Development Program. Here we act as a middleman to identify Nigeria's technical assistance needs and then actually arrange for Nigeria to pay for these technical services under contract to U.S. Federal agencies. When they can't provide the services required by Nigeria, then we go out to a U.S. private contractor and negotiate for the kind of technical support you mentioned.

So we have several ways of handling the transfer of technology. It's interesting that in Nigeria AID has now been asked to consider developing a new program beyond our reimbursable technical services which are paid for by the Nigerians from their oil resources. We are considering a modest concessionary assistance program to supplement the services they pay for themselves. There will be a technical mission going out to Lagos in February to look into some of the priority and technical areas that the Nigerians have identified as needing assistance. One of these, for example, would be the trade, industry, and science-technology fields.

Senator SCHMIDT. How long is this process going to take at its present rate?

Mr. EILERS. It's difficult to say.

Senator SCHMIDT. The scale of the AID operations, as important as they are, and I'm very impressed with many I have come in contact with, still is small compared with what Father Hesburgh and I and the rest of us would like to do.

If you want to see this thing come about, the efforts have to be scaled up by factors of 10 and 100. I'm not saying U.S. dollars. I'm saying whatever effort is required, and by the investment of the country itself, world financial institutions such as the World Bank, and as appropriate, by the investment of our private sector because there is something at the end of that 10-year period, that is going to be a financial incentive to them.

In this kind of mechanism, I think, is the lead for a much more rapid transfer of technology that what we have done up until now. That relates to no criticism of what we have done up until now. We have been trying. I think it's clear, if we are going to take advantage of this Conference and the momentum that it could generate, and we all hope it can generate, we have to look at a much more massive scale of operation.

That's something beyond the capability of our Government, and it has to mobilize the private sector of this country, but in a way that is compatible with our basic processes.

Mrs. Benson, you're nodding your head.

Mrs. BENSON. Yes, because what you are saying is absolutely right. I believe the United States has to show the lead in this area. First of all, we have to show the lead, and then we and the rest of the indus-

trialized world have to lead together in doing what you are talking about.

It is going to take more U.S. dollars, it's going to take more U.S. effort in particular, as you pointed out, and this is something that not only the Department of State but the entire administration is very interested in. In fact, as Father Hesburgh mentioned, how to do it, how we develop, the political will is one of our larger problems.

At the present time it doesn't seem that the political will, I mean not just the leadership of the executive branch or the Congress, but the country as a whole, is especially interested in the problems of the less developed world. To develop this interest on the part of our country is going to be a challenge to our political establishment because without that political will, we will never have the physical energy, let alone the dollars, to do the job that needs to be done, or even to mobilize the private sector.

This requires a good deal of doing. Father Hesburgh, of course, is chairman of the board of the Rockefeller Foundation, which is one of the foundations in our country most experienced in this area and involving both the private and governmental sector.

I would like to ask him to speak to this.

Ambassador HESBURGH. Mr. Chairman, Senator Schmitt, as you probably know, the Rockefeller and the Ford Foundations did get into the initial work in agriculture, but shortly thereafter it was obvious that two foundations can't provide the revolution for the whole world in the area of agriculture.

Once we got these establishments in place, we had to do two other things. We had to involve governments all over the world. Much of this discussion and effort led to the World Food Conference in Rome, which I attended several years ago. Out of that grew a billion-dollar commitment of all the countries in the world, including the oil countries that contributed rather handsomely to this fund. The World Food Council can now dispose of a \$1 billion to work toward feeding the world and growing the food where it's most needed.

It's preposterous to think the United States can continue to grow great surpluses and feed the whole world. We have to make everybody self-sufficient in food and grow the food where it's needed. Philosophically, this is what interested me. In the whole discussion, there isn't a single problem facing the world today that can't be handled by governments, as nation states. Every single problem is completely interdependent. There's no national energy problem that can be somehow abstracted or set aside from a world energy problem.

There is no national answer to food, it's a world problem; a global problem has to have a global solution. No one nation can solve that problem. There is no national haven against terrorism as long as there is a place for them to go.

We all share the same water and air, and we have to get an interdependent global balance.

If you will excuse me, Senator Schmitt, I'm not trying to batter you, but it's a deep perception on my part that the greatest result of the space program was the view of the Earth from the Moon, not what we found on the Moon itself.

Senator SCHMITT. I agree with that completely.

Ambassador HESBURGH. Once we saw that beautiful little satellite out there, green and blue and flecked with white clouds, more beautiful from afar than it is up close, we somehow got the perception we are indeed a satellite. We are, as Barbara Walters said, spaceship Earth.

Because of that, because we share the same water, the same air, same ground, we somehow have to learn to see that the people aboard this spaceship, the crew get reasonably even treatment, and that there is hope for everybody, not just one member of that group.

Today we have a terrible problem of unjust distribution of the goods of this Earth. Twenty percent of the world has access to 80 percent of the resources. You couldn't imagine aboard a spacecraft of 5 members representing the whole population of the world, that 1 member—representing us and the developed world—would have 80 percent of the life system, with the others forced to get along on what is left and the gap widening all the time.

The philosophical notion of interdependence, the fact there has to be a global solution to these problems—that is what we have to learn from the space programs.

We will see that all of these problems are interrelated. Population is certainly interrelated to hope and development. Every developed country controls its population, practically every undeveloped country tries to do so. There is something to be learned there. Certainly environment has something to do with development. Development can ruin the environment if not approached properly. The whole question of health is so tied into nutrition, the two have to go hand in hand and so forth.

Not only is each problem global in its sweep and only global in its solution, but the same point is, each problem is interlinked. That is why I said, having looked at all the problems discretely and separately, such as food or habitat, or environment, women, human rights or trade or any of the rest, we now, I think, have to pool them in this conference and say, let's take this great aspect, science and technology, and find out how we can put it to work in a way that will turn people on rather than turn them off.

My final point is, I live in a world of young people, in the university. Whatever one says about the older part of our population, I must say, the young people are looking for lives that are going to be meaningful. They want to make a difference in the world.

You hear this all the time, what can I do that will give me personal satisfaction. I am creating a better world. I think we are at the brink of kind of a new day here where scientists and technologists of any age want to make a contribution, and they are bothered about contributing possibly to destruction. Youngsters are looking for ways they can link into a whole world system of solutions and be part of working toward those solutions.

It is amazing the concern of young people today for justice, not just here but around the world, how much they are turned on by the fact that we can get rid of world poverty. We can do it. How do we get the political will?

Maybe the greatest problem before us in this Conference is to get beyond rhetoric to a real perception of the opportunities and the great challenge and the kind of realistic systematic approaches that can get

us from where we are to where we want to be as a world, as an Earth satellite, if you will, totally contained, and we must find solutions that are total, not just partial.

Senator SCHMITT. Well, Father, if our efforts in the last decade were as successful in convincing other people as we appear to have convinced you that we do have a spaceship Earth, then I think everybody who is involved would appreciate, as I do, your remarks.

I think that many individuals, like yourself, have come away from that period in our history with that feeling. I certainly have. I think the young people have. I spend a great deal of my time speaking about space and science with young people. That sense of goal or purpose is there. There is no question in my mind it is there. It is up to us to tap it. If we can tap it, then you can move mountains, you can conquer other worlds as we have shown in American history in the past.

I do want to add to your insights, that this spaceship Earth is not a closed system. It does run by solar energy. It is a solar engine, literally. All of our discussions, national and international on how to find peaks of energy is lost in the noise, if you will, of what is really happening in this spaceship. Our energy source is the Sun. I think for the developing world, that is a very important concept. It is also one that is not lost on the younger people of this country and other parts of the world.

I also would add, as a geologist, that the Earth is tremendously resilient. That does not mean we should go around assuming we can't damage it, but it is resilient and we have to in many cases, particularly in the modern age, spend some time taking advantage of that resiliency while we develop the inexhaustible energy sources that will be compatible with the long-term environment.

Also, there are resources that are yet to be attacked in the spaceship. Yes; your statistics serve out, there is a great disproportionate use of not only the resources of the Earth or the available resources, there are many others.

Much, if not most, of those resources lie untapped within the very countries we are discussing today. Again, the challenge in the foreign policy of this country is to find those mechanisms by which those are attacked, not the least of which are the human resources that are there.

I think, though, relative to Mrs. Benson's comments about the lack of political support in this country for some of these things, I think that the political support is there, particularly among the young people.

The problem has been seeing a history of foreign aid dollars go out without any noticeable effect. Many of the AID programs are to the contrary; they have been successful. That is why I am exploring ways in which the dollar outflow is minimized, maybe even reduced, and I think it is within this interaction of our private sector with the need of developing world, encouraged hopefully by the good will and direct intervention of the State Department, that we have ways in which we do things without a major outflow of foreign aid knowledge.

If I understood you correctly, Mrs. Benson, I would disagree with you that it will take a large number of dollars to implement the kind of things that I think we have been discussing here. I think if we mobilize the resources of the world community, including the nations that need the assistance most, that the dollar contribution of this country is going to be minimized, and with the right kind of contractual arrangement and the right kind of financial arrangement,



utilizing internal and external resources of these countries that we can get the job done without the transfer of dollars, which is what not only our people resent but, in fact, the people of the developing world resent.

Mrs. Benson. Senator, I don't think either one of us want to get engaged in a philosophical discussion of dollars or not dollars. I don't disagree with what you say, but I also would not want to, were I making the decision, to commit myself to the—to the idea that no more dollars are needed.

What I think we need to do is to look at all the problems and see what can be done, not look foremost to the use of the dollar to solve the problem which we may have done too often in the past, but look to all methods of going about it, as you outlined, energizing the private and public sector in different ways, not just depending on the dollar.

I think I would have to say, as far as I can see, it will take some but probably not less dollars. However, I'm willing to wait and see what happens in the long run and approach it from your point of view.

The will is out there, I agree with you, but it has to be mobilized and it has to be mobilized with ideas. That is what makes people hopeful, is a hope for success. I think the amount of money the United States and other countries have poured into various efforts such as that by AID has been considerable. It hasn't been all that much when you consider what the total GNP of the world is or was 10 or 15 years ago, 20 years ago, when we began a program.

One of the great problems is, which we all complain about in the legislative branch and executive branch and everywhere else in the world, is that failures are always the things that get the public notice, not the tremendous number of good, solid contributions and projects that have really paid off which AID has developed over the world but nobody pays attention to that, but only to the mistakes. This is an age-old problem which I daresay we will never solve. But I wouldn't want to leave anybody with the impression I don't think the will is there. It is there, but it has to be put together and moved forward.

Senator SCHMITT. Thank you. This has been a very stimulating discussion for me at least, and I hope will lay the groundwork for further interaction between the panel and others in this committee.

I am concerned about two detailed questions and the answers can probably be very brief.

Do you see the friction that has been reported to have developed between Mr. da Costa and Mr. Standke as now largely resolved? Will the Conference be hurt as a consequence of that friction?

Mrs. BENSON. I think that is a difficult question to answer. I will ask Ambassador Wilkowski to comment on it because she has been more directly related to this particular controversy.

I think it has hampered movement somewhat up until now. I hope that it will not hamper our movement and the movement of the whole forces working to put this Conference together, but I think we have to understand that just as there are conflicts among countries, there are conflicts among people. I would not want to indicate that I think this particular conflict is totally resolved.

Jean knows more about this.

Ambassador WILKOWSKI. I think it might be inappropriate in a public record such as this to comment on the personalities of the two and give any kind of evaluation.

I know both of them, have had several meetings with them, and I find them both extremely able people and both very much interested in the success of this Conference. I met—I have gotten the message from Ambassador da Costa recently and heard directly from Mr. Standke and they tell me that any differences that may have occurred in the past have been largely operational differences between the two of them, that there has been some kind of misunderstanding but this rivalry and tension are on the decline. One of the important differences between them has revolved around how to use the U.S. Office of Science and Technology in this Conference.

I think they are getting closer together, between the two offices.

Senator SCHMITT. That is encouraging. I know you will do everything you can to encourage that.

The problem of training persons from the developing world in this country was something that came up all through my travels, but unfortunately in a negative way, in that so many of those individuals we train never go back to their country. Do you see any resolution of this problem?

Ambassador HESBURGH. I think one way of getting at it, Senator, is to simply have the matter of their return worked out beforehand. The reason many people don't return is simple. I know, for example, a young lady who came to a good university in the United States, got a Ph. D. in biochemistry, and returned to her country in Southeast Asia and was reduced to washing dishes. In the Rockefeller Foundation, we have a minimal brain drain, although we have trained thousands and thousands of people from all over the world: We don't bring people here or to Europe for training unless we are assured when they return there will be a higher post for them than they had when they left their country to get trained somewhere else.

I think these matters have to be worked out before hand. People have to know there is something to go home to, some job that will make use of their new knowledge, and some way they can expand their horizons because of the effort they put into being educated.

I find that that simple precaution in the preliminary negotiations, saying to the Government involved, if we support this person for study abroad, what will he or she have to do when they get home? You get that worked out before hand, then train them specifically to go home and do a better job at something else. It generally works out.

I would guess our brain drain in the program involving tens of thousands of people would be less than 4 or 5 percent. That includes brain drain some years down the pike after they have gone home and done something.

Senator SCHMITT. Thank you.

I hope we will, in fact, follow that kind of precedent, to insure that this does not continue because it is a disincentive for the leadership of these countries to allow them to continue to do that.

Thank you.

Senator STEVENSON. Father Hesburgh, are jobs, enough food, shelter, universally recognized fundamental human rights?

Ambassador HESBURGH. I don't know if they are universally recognized by countries. They certainly are universally recognized people. I have found traveling the world, most parts of it, many times that if there is one thing that you can universalize about is most human beings share the same kind of hopes. I have not found anyone in the world who has said they don't want to be free as a human being. There are many who aren't. I don't know many people that don't like to eat several times a day, or enough necessary to keep from the hunger pangs, that result in lack of ambition or energy to do something. I don't know of many people in the world who don't want more education than they have a chance of getting.

The desire to learn is pretty deep in the human spirit, especially when people are shown through satellite television, that learning is possible somewhere in the world, and this results in a wonderful world much better than the kind of dull, drab world that characterizes many people in undeveloped countries. I don't know anybody that likes to sit in the rain, except maybe on a hot day, but most people like to be under cover when it rains. When it is cold they like to have some protection against the cold. I think that housing, decent housing, is again a hope and desire of the whole world.

This is really asking for such a minimal kind of approach to human life, that people have enough to eat, that they have a house to go in when it rains or when it's cold, that they have education for their children, that they have it close to something decent, that they can have hope for working and taking care of their families and people that depend upon them. These are basic things, we call them kind of a basic quality of life index in the Overseas Development Council.

Beyond that there are hopes of human rights that transcend strictly economic and social orders. Those of the human order. But it is silly to talk about human rights for a free press if you don't have enough to eat or money to buy a newspaper or if you can't read. That is why I say again, we are talking about a totality, a continuum of rights, that involve social rights, economic rights, political rights, civil rights, the whole complexion of human rights, but you have to begin somewhere, and I keep remembering a wonderful statement of an old famous saint in Spain, Saint Theresa of Avila. She said, 'If someone comes to you and says, "Teach me how to pray," and he is hungry, you better feed him first. It is kind of hard to pray on an empty stomach.'

Senator STEVENSON. I think Mrs. Benson knows what my next question is. But I am going to ask it first and I want to ask it bluntly. Those prerequisites, such as food and shelter and work, those prerequisites to life itself, are basic human rights. They are rights to exist. My question to you, Mrs. Benson, is that assuming this unarguable proposition, is it then the policy of the United States to support development in and technology transfers to countries which seek to respect those fundamental rights but do not indulge themselves in policies promoting political and civil rights? Let me put it slightly differently. Are we going to run the risk of isolating ourselves from the world with a handful of other rich countries which do recognize as we do, all of those political and civil rights, which in the rhetoric of the United States frequently parade under that rubric of human rights, or are we prepared to embrace mankind everywhere and

recognize that the fulfillment of those most fundamental rights generally precede the fulfillment of the political and the civil rights as it did here in the United States?

Mrs. BENSON. Senator, I certainly hope we are not going to isolate ourselves with a few countries and ignore the basic human needs of other countries. There is nothing that I know of in the policy of this administration which would indicate that we are going to do that. The President has spoken a great deal about basic human needs and about the world in a global context.

I suppose you must be referring to the application of our human rights policy. This is a problem over which the administration is struggling: how to apply, where to apply, when to apply, and what kind of pressure to apply, on countries which are pervasively ignoring a basic human right in terms of torture and that sort of thing; and how should we be associated with countries like that. Our overall intention, as I understand how the State Department and the White House sees it, is to ally ourselves with the rest of the world in a wholesale onslaught on a variety of these problems Father Hesburgh has spoken so articulately about.

Senator STEVENSON. My concern, Mrs. Benson, is that the rhetoric of American policy about human rights tends to neglect the most basic human rights of all. If we are really serious about civil and political rights that we are so eloquent about, we must first face up to those basic human rights like food, shelter, and employment. The other in time will come. We must do so, even if it means embracing some countries that have governments or forms of governments that are not very congenial to us, that don't fall in our own mold. Not many countries can afford our mold.

Mrs. BENSON. I agree with you completely, Senator Stevenson. The fact is I think there are only a small number of countries out of some 100-odd all over the world, 14 or so, which have governments which could remotely be called politically free. I think our basic problem here is one of rhetoric, and I agree about that, too. We do have, and have had over the years, historical relationships with a number of countries which do indulge not just in lack of freedom, not just lack of basic human needs of food and shelter we are talking about, et cetera, but do indulge in torture of their political prisoners particularly, and other actions that are not acceptable.

I think our problem now is trying to figure out in our relationships with these other countries, which are sometimes military and sometimes economic, sometimes both, just how to handle that particular situation. But I agree with you that I don't think we can ignore the fact that there is a great deal of torture going on in a number of countries. On the other hand, it cannot be the only consideration. Developing some kind of a balanced way of coping with this particular problem I think is a difficult one.

Senator STEVENSON. I think we understand each other, but I certainly don't want to suggest that the United States associate itself with countries that systematically torture their people or, for that matter, systematically deprive them of the basic human rights.

There are countries which try but cannot indulge themselves, or do not, in all of what we call political or civil rights, which are frequently referred to in our discussion of human rights. Now, I have just a couple of other questions.

First of all, who is going to host this Conference, and in the possibility that it is the United States, are we prepared to do so?

Mrs. BENSON. I don't know who is going to host the Conference; it may be decided today in the United Nations. It has been a subject which has been talked about much, but it has not been acted on until quite recently. As you well know, the United States issued an invitation to the United Nations, over a year ago. There has been action recently in Committee 2 of the U.N. and today in the General Assembly. It is sort of a questionable situation, and I have no idea how it will turn out.

If it turns out that the Conference is located in the United States, we will start moving instantly. We are poised to move. If it ends up in Austria or Mexico, we will be poised to do whatever we need to do there.

I can't answer your question. I want to know as badly as you do.

Senator STEVENSON. Very well. We will await with interest the result of that vote and follow through on the preparations wherever the Conference is held.

Now, another basic proposition to which I would welcome a response is this: Doesn't the success of this Conference and the entire effort depend more than anything else on the economic conditions of the world, especially the industrialized world? The condition of the industrialized countries is shaky. The United States in some ways is behaving like a less developed country. We export raw materials and import technology from Japan.

Since the oil embargo and the quadrupling of the oil prices, the international debt has leaped quintuply. There is scarcely a country in the world—maybe I could say there is no country in the world outside of Japan, West Germany, and of course, the OPEC countries—which is not experiencing serious, deep, chronic, current account deficits. They have, therefore, borrowed heavily, which explains the quintupling of the debt. Most of them now have run out of credit, especially the lesser developed countries.

In fact, it is now more optimistic for some of the less developed countries than for some of the more developed countries. If this process continues and, as Father Hesburgh predicted, the countries begin to go under, it won't be long before we all go under. Our economies are interdependent.

Already, even before the process is begun in earnest, we perceive in the United States and other industrialized countries the ugly head of protectionism arising. It takes many shapes. Reluctance of industry and labor, who fear competition from abroad, to transfer technology to other countries is one. Quotas and other import limiting devices are another.

It seems to me that the success of the entire effort depends on a more healthy world economic environment. Therefore, preparations for this Conference and everything that it is intended to achieve, depend on giving immediate and more serious attention to the world's economic problems. If we do not do this, at this 1979 Conference, we are going to find the world suffering from serious recession and serious inflation. The climate then, I am afraid, will be very inhospitable to everything we want to achieve.

I recognize that this job is not entirely within the domain of the State Department.

Mrs. BENSON. Thank you.

Senator STEVENSON. But how do you respond to that proposition? Do you accept it as a valid one?

Mrs. BENSON. Yes; I do accept it as a valid proposition. There is not very much more really I can add to your analysis of the impact on the Conference, if we were in the midst of another worldwide recession.

I think that efforts on the part of the industrialized countries in particular, also on the part of the oil-exporting nations, to see that we do not get into another recession, depression, which produces another round of the problems we have had in the past few years, is extraordinarily important.

It is important not only for this Conference, of course; it is important for all of the reasons that the Conference generally encompasses. I wish I had the answers to the many questions which are contained in your analysis. What to do about this? How to do it? When to do it? Who can do it?

We all have various ideas about this, but I cannot disagree with your analysis of the urgency of the situation which faces the entire world, and certainly its members which are most able to move ahead and cope with this problem.

Ambassador HESBURGH. I am in complete agreement.

Senator STEVENSON. There is agreement on the proposition.

Senator SCHMITT. If the chairman would yield, I would also add my agreement.

Senator STEVENSON. But there is much disagreement on what to do.

Senator SCHMITT. I have one other thing, which is also generic. That has to do with this country's approach to research and development in both the private and governmental section.

One of the reasons, I think, for this tendency to erect these walls of protectionism that Senator Stevenson has referred to is that we have not been at the leading edge of technology as we have through most of our history up until this last decade, and when you are not out there, then there is a tendency to try to protect what you have—which is impossible. At the most, you might slow down some losses, but you are not going to reverse them.

This Nation's policies that relate to either the stimulation of either private research and development or the initiation of federally funded research and development will affect what we have to transfer as time goes on. It doesn't affect so much the basic types of technology Father Hesburgh has looked at—we all look to eliminate poverty and disease and so forth, but it does affect our ability to transfer the benefits of higher technology, which, in many cases, will form the infrastructure by which we can do these other things.

We would not be able to say we can do these other things if we didn't have the technological revolution occurring that establishes the infrastructure, communications, transportation, and so forth that make possible the transfer

Does the State Department perceive this problem of a diminution of our research and technology progress as critical to the long-term success of this effort?

Mrs. BENSON. Yes, Senator. I think it is safe to say that the State Department does perceive this as a critical problem. I conceive it as a

critical problem. I do not think, however, our society in general or even the State Department in general appreciates the critical importance of research and development to all of the things in which we are involved in foreign policy.

It is my own view that we have suffered very greatly over the past 10 years or so by letting down our emphasis on research and development in this country. This can easily be seen from the much lower level of research grants provided by the Federal Government to all kinds of research efforts.

I think that will be turned around very soon. It can't be too soon. I think it is critical. The State Department is emphasizing, as it has never emphasized before, the importance of science and technology in the formulating and then the carrying out of foreign policy, but we are just beginning to put the kind of emphasis on that whole subject area that needs to be placed.

I can't say the State Department is fully aware of the importance of science and technology in solving world problems, but it is moving there very rapidly and the Secretary of State, Mr. Vance, is exceedingly interested in this himself.

Senator SCHMITT. I hope he will carry that to the other members of the administration, because this subcommittee has been exposed to, on a limited scale, reluctance to support science and technology at the Federal level that fits right into the lines of activities that your efforts are involved in.

Also we have seen, certainly on a broader scale than just this subcommittee, an apparent reluctance to encourage Federal research and technology. Certainly the President's energy message was not a research technology or research and development message. It was one of taxes and regulation, which in turn is the basic reason the private sector has not been investing, in my opinion, in advanced technologies like we would like for them to, and the Government will never, I don't think, duplicate the scale that is possible within the private sector, if the tax and regulatory environment is conducive to that investment.

I am not advocating nonregulation. I am advocating only regulations, though, that legitimately foster the interest of the Nation. So I hope that the message gradually surfaces at other levels in the administration, because I agree with you.

I agree with your statement and I hope that Secretary Vance is also being convinced, but you have other persons that must be convinced also.

Thank you.

Senator STEVENSON. We will be following your preparations with great interest. I hope that you will let us know how we can be of help Ambassador Wilkowski, if you hear today about the Conference site decision before the hearings are concluded, I would appreciate it if somebody would be good enough to pick up the telephone and let us know what the situation is.

Ambassador WILOWSKI. I know exactly where I am going right after this hearing.

Senator STEVENSON. With that we thank you all.

Our next group of witnesses is also a panel: Dr. Guyford Stever, Chairman, National Academy of Sciences Task Force on the National Paper; and Harvey Averich, Assistant Director, Directorate for Sci-

entific, Technological, and International Affairs, National Science Foundation.

Senator SCHMITT. Gentlemen, the chairman will return shortly. We would appreciate it if you would begin.

Dr. Stever, it's good to see you again, and we hope you are enjoying your present activities, and we look forward to hearing your testimony.

**STATEMENTS OF DR. GUYFORD STEVER, CHAIRMAN, NATIONAL ACADEMY OF SCIENCES TASK FORCE ON THE NATIONAL PAPER; AND DR. HARVEY AVERCH, ASSISTANT DIRECTOR, DIRECTORATE FOR SCIENTIFIC, TECHNOLOGICAL, AND INTERNATIONAL AFFAIRS, NATIONAL SCIENCE FOUNDATION**

Dr. STEVER. Thank you, Senator Schmitt, thank you very much.

It's a privilege to testify before your committee on this important subject, and especially wonderful to hear the previous witnesses in their introduction, laying the humane understanding background for this activity.

I would be tempted to say we now have to get down to the nuts and bolts of science and technology, and I'm leading one of those efforts, but you can see why I'm not going to put it that way.

It's been almost 15 years since the 1963 Conference on the Application of Science and Technology for the Benefits of the Less Developed Areas. That conference, as you will remember, generated an enormous volume of material on the state of science and technology at that time. But 15 years in science and technology represents many generations of research and development. Furthermore, the "less developed areas" have changed a great deal since then, some of them almost beyond recognition. And the world has come to recognize new problems—such as finite energy supplies, environmental degradation, runaway population growth—that it was hardly conscious of back then.

It is high time to take another look at the links between science and technology and development.

In many ways the Conference comes at a time of transition, when we are moving toward a more realistic view of what successful development means. The experience of the past quarter century has shown the limitations of equating growth with development. Many developing countries—with help from the international community including the United States—have had great success in raising their gross national products, increasing food supply, and improving health and living conditions, yet millions of citizens in poor countries remain untouched by these successes. Many development specialists have come to believe that the problem of meeting basic human needs will have to be attacked directly if the benefits of progress are to reach the great mass of humanity.

One of the results of the development effort to date is that there is now a growing scientific and technological infrastructure in many developing countries. In 1963, the scientific and technological contribution to development was almost wholly one way—from the United States and other industrialized countries to the developing countries. Much remains to be done in the way of strengthening science and tech-



nology in LDC's, but the fact is that today there is a potential for co-operation among scientific and technological communities worldwide that did not exist 15 years ago.

Let me turn to page 3 of my testimony and confine the rest of my comments to the way the executive branch is approaching the private scientific and technological community through the National Research Council, the operating arm of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

As you know, NRC has agreed to undertake a study that is now underway. The aim is to present to the State Department by mid-April a report which can contribute to the S. & T. core of the U.S. position to be expressed in our national paper to the U.N.

Our substantive effort is organized around five panels dealing with subjects suggested first, I believe, by the nascent Council on Science and Technology for Development, led by Dr. Frederick Seitz. The panel titles and subject matter are: Panel 1—population, public health, and nutrition; panel 2—energy, natural resources, and environment; panel 3—food, water, soil, and climate; panel 4—employment, trade, and industrialization; and panel 5—urbanization, communication, and transportation.

These panels, now in place, comprise about 70 invited, volunteer scientists, engineers, and others with experience and knowledge in S. & T. applicable to development; they are being assisted by a variety of other interested institutions including other units of the NRC.

Each topical study will proceed from the hypothesis that the best U.S. posture for the U.N. Conference is to be able to offer specific types of U.S. collaboration in those problem areas in which our scientific and technological resources could be mobilized in support of LDC needs.

We have asked each panel to pick approximately five top priority areas within their purview, with a priority determined, first, by its potential effective contribution to furthering the development objectives of the LDC's; second, by its scientific and technological doability; third, by the contribution U.S. science and technology can make; and fourth, by the climate of incentives and constraints for U.S. involvement. You can see right off that 5 times 5 ideas may exceed the funding possibilities, but it is our view that an "idea bank" can be useful.

We expect to handle some subjects in cross-cutting exercises after we have some returns from the initial "vertical" review of the substantive panels. In hopes of stimulating communication on this subject from readers of the Congressional Record, and in recognition of their contribution, I am listing here the members of the steering committee, the panel members, and NRC staff of the NAS study.

In any consideration of development, many caveats and constraints are evident. One is increasingly worrisome. That is, there is a real fear—and not just on the part of American labor—that, by building S. & T. capability in developing countries, we will be exporting jobs and encouraging competition for ourselves in agriculture, in aerospace, in electronics, and so on. This must not be ignored. It is my opinion that, with due attention on the domestic front, the American economy need not suffer in the long run. We can pursue a good course in helping others in a humanitarian way, and at the same time do business with them in a profitable sense, recognizing that we need

developing countries as trading partners, as markets for our products, as reliable sources of both goods and materials needed for our own economic growth, and as neighbors who live proudly and as well as we do.

But the subject is pretty touchy now, and we had best recognize it.

Another constraint is the basic difference between the private sector incentive system that permeates American science and technology, and the public sector orientation and central economic direction of technology, which is characteristic of many less developed countries. Some representatives of other nations seem to say, "It is just not conceivable or believable to us that the powerful U.S. Government, representing the people of the United States, cannot change, or make an exception, to the rules of private intellectual property rights, so that the United States can contribute more to developing countries." Much relevant science and technology information is, of course, in the public domain. But I do believe that there is a lot of worthwhile, relevant S. & T. information which, if properly organized and compensated, could be made available by the American private sector to developing countries.

Let us not fool ourselves. Public funds are paid out when a direct contribution is made by the U.S. Government to American academic organizations working on development problems. Why shouldn't Government funds be paid to private profit-oriented corporations for development purposes? The principle is the same. It just requires different agreements.

The NRC study will attempt to take account of constraints such as those I have just mentioned.

We will seek to tap a great variety of other individuals and organizations in the United States through a series of public forums. Four of these will be held—the first in Atlanta, hosted by Georgia Institution of Technology on January 16; the second in St. Louis, hosted by Washington University and the U.N. Association of St. Louis on January 23; the third in New York, hosted by the Polytechnic Institute of New York, on January 24; and the fourth in San Francisco, hosted by the World Affairs Council, also on January 24. It is our hope that many ideas will be forthcoming in these public forums.

I should note that interest within the science and technology community in this Conference, and in preparations for it, is very strong. In helping to put together the panels which will contribute to the NRC report, I observed that the acceptance rate by invited persons was very high, even though the short time scale—a report to be submitted by next April—required reordering of personal priorities and calendars. As I judge it, the S. & T. community is especially anxious that the science and technology content of the U.S. preparatory paper, and of the Conference itself, be high.

There is concern expressed by many leaders and groups of the science and technology community that political and economic issues will overshadow the S. & T. content. There is a concerted drive not to let this happen.

I believe we in the United States are in the midst of yet another transition, one of which we can be proud, as we help others, and they help us in tackling the quite surmountable problems of population, health, food, energy, resources, cultural and artistic growth, and pres-

ervation. Development cooperation is one of the inventions of this century to help attack these problems. Science and technology are important components of that cooperation. I hope your oversight role of the science and technology contribution to development is as satisfying to you as it is necessary to the effort.

[The statement and attachment follow:]

#### STATEMENT OF H. GUYFORD STEVER

It has been almost fifteen years since the 1963 U.N. Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas. That conference, as you will remember, generated an enormous volume of material on the state of science and technology at that time. But fifteen years in science and technology represents many generations of research and development. Furthermore, the "less developed areas" have changed a great deal since then, some of them almost beyond recognition. And the world has come to recognize new problems—such as finite energy supplies, environmental degradation, runaway population growth—that it was hardly conscious of back then. Thus, it is high time to take another look at the links between science and technology, and development. The United States, no less than the developing countries, should welcome the decision of the Seventh General Assembly to convene a General Conference on Science and Technology for Development, presently scheduled for mid-1979.

In many ways, the Conference comes at a time of transition, when we are moving toward a more realistic view of what successful development means. The experience of the past quarter century has shown the limitations of equating growth with development. Many developing countries—with help from the international community including the United States—have had great success in raising their Gross National Products, increasing food supply, and improving health and living conditions, yet millions of citizens in poor countries remain untouched by these successes. Many development specialists have come to believe that the problem of meeting basic human needs will have to be attacked directly if the benefits of progress are to reach the great mass of humanity.

One of the results of the development effort to date is that there is now a growing scientific and technological infrastructure in many developing countries. In 1963, the scientific and technological contribution to development was almost wholly one way—from the U.S. and other industrialized countries to the developing countries. Much remains to be done in the way of strengthening S. & T. in LDCs, but the fact is that today there is a potential for cooperation among S. & T. communities worldwide that did not exist 15 years ago.

A partial answer to your first question, "What should be the immediate and longer range goals of the Conference?", is that there should be a review of past development experience, so that the world community of scientists and engineers can better see their own place in this effort. Such an understanding will give the institutions of science and technology in both rich and poor countries the opportunity to match their own special dynamic characters to development needs.

The Conference might also serve as a review of the techniques and activities that have been most, or least, successful in the past, in order to permit better selection in the future. Another indirect goal is to obtain better recognition of the time-scales associated with the many different types of science and technology development programs and projects. Still another goal is to illuminate the differences among developing countries' needs and desires for S. & T.

Your third question was "How would you assess the preparatory efforts currently underway by the Executive Branch?"

First, let me say that I am convinced that U.S. participation, indeed its advocacy and active leadership, in all phases of the preparation and realization of the 1979 U.N. conference, is essential to a successful discussion of the application of scientific and technological resources to economic and social development. The U.S. remains committed to assist the developing countries to meet their basic needs and to share more fully and equitably the fruits of American research and development.

Let me confine the rest of my comments to the way the Executive Branch is approaching the private scientific and technological community through the National Research Council, the operating arm of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. As you

know, NRC has agreed to undertake a study that is now under way. The aim is to present to the State Department by mid-April a report which can contribute to the S&T core of the U.S. position to be expressed in our national paper to the U.N. If we succeed, as I believe we will, the answers to your second and fourth questions, "What should be the roles of the scientific, academic and nonindustrial private sectors in achieving these goals?", and "How important is the concept of transferring 'appropriate technology' to the developing countries? How can professional and nongovernmental organizations contribute to this effort?", will be answered.

Our substantive effort is organized around five panels dealing with subjects suggested first, I believe, by the nascent Council on Science and Technology for Development, led by Dr. Frederick Seitz. The panel titles and subject matter are: Population, public health, and nutrition; energy, natural resources, and environment; food, water, soil, and climate; employment, trade, and industrialization; and urbanization, communication, and transportation.

These panels comprise about seventy invited, volunteer scientists, engineers, and others with experience and knowledge in S&T applicable to development; they are being assisted by a variety of other interested institutions, including other units of the NRC.

Each topical study will proceed from the hypothesis that the best U.S. posture for the U.N. conference is to be able to offer specific types of U.S. collaboration in those problem areas in which our scientific and technological resources could be mobilized in support of LDC needs.

We have asked each panel to pick approximately five top priority areas within their purview, with a priority determined, first, by its potential effective contribution to furthering the development objectives of the LDCs; second, by its scientific and technological do-ability; third, by the contribution U.S. science and technology can make; and fourth, by the climate of incentives and constraints for U.S. involvement. You can see right off that 5 times 5 ideas may exceed the funding possibilities, but it is our view that an "idea bank" can be useful.

As soon as one decides on the substantive organization of such a project, the "otherwise" thinking emerges. In our case, it seems that many believe that our panel focus on subject selection is "vertical" and will not do justice to the "horizontal" ordering of issues along such lines as education, training, financing, international organizing, etc. We expect to handle these latter subjects in cross-cutting exercises after we have some returns from the initial "vertical" review. In hopes of stimulating communication on this subject from readers of the Congressional Record, and in recognition of their contribution, I am listing here the members of the Steering Committee, the Panel Members, and NRC staff of the NAS study. (Attachment)

In any consideration of development, many caveats and constraints are evident. One is increasingly worrisome. That is, there is a real fear—and not just on the part of American labor—that, by building S&T capability in developing countries, we will be exporting jobs and encouraging competition for ourselves in agriculture, in aerospace, in electronics, and so on. This must not be ignored. It is my opinion that, with due attention on the domestic front, the American economy need not suffer in the long run. We can pursue a good course in helping others in a humanitarian way, and at the same time do business with them in a profitable sense, recognizing that we need developing countries as trading partners, as markets for our products, and as reliable sources of both goods and materials needed for our own economic growth. But the subject is pretty touchy now, and we had best recognize it.

Another constraint is the basic difference between the private sector incentive system that permeates American science and technology and the public sector orientation and central economic direction of technology characteristic of many less developed countries. Some representatives of other nations seem to say, "It is just not conceivable or believable to us that the powerful United States government, representing the people of the United States, cannot change, or make an exception, to the rules of private intellectual property rights, so that the U.S. can contribute more to developing countries." Much relevant S&T information is, of course, in the public domain. But I do believe that there is a lot of worthwhile, relevant S&T information which, if properly organized and compensated, could be made available to the American private sector to developing countries. Let us not fool ourselves. Public funds are paid out when a direct contribution is made by the U.S. government to American academic organizations working on development problems. Why shouldn't government funds be paid to private profit-

oriented corporations for development purposes? The principle is the same. It just requires different agreements.

The NRC study will attempt to take account of constraints such as those I have just mentioned.

Ideally, the selection of priorities would best be done by a lengthy interchange with developing country leaders, but we can do only a little of that because of time constraints. We must depend to a considerable extent on the knowledge of many of our own panelists who have been thoroughly involved in these matters in the past.

We will, however, seek to tap a great variety of other individuals and organizations in the U.S. through a series of public forums. Four of these will be held—the first in Atlanta, hosted by Georgia Institute of Technology on January 16th; the second in St. Louis, hosted by Washington University and the U.N. Association of St. Louis on January 23rd; the third in New York, hosted by the Polytechnic Institute of New York, on January 24th; and the fourth in San Francisco, hosted by the World Affairs Council, also on January 24th. It is our hope that many ideas will be forthcoming in these public forums.

In our report, we will not dwell on political and funding constraints, though we will be mindful of them. We want to concentrate on the scientific and technological do-ables, selecting them in a priority order determined by the degree of contribution they can make to the developing countries.

Naturally, ours will not be the only input to the State Department and other Administration officials charged with putting together the official U.S. position. In our pluralistic, multiply-connected U.S. society, there are many channels to those with responsibility. The State Department and other units of the Administration have commissioned other studies, and many members of the S&T community are volunteering their opinions to Government agencies. This is as it should be.

I should note that interest within the science and technology community in this Conference, and in preparations for it, is very strong. In helping to put together the panels which will contribute to the NRC report, I observed that the acceptance rate by invited persons was very high, even though the short time scale—a report to be submitted by next April—required reordering of personal priorities and calendars. As I judge it, the S&T community is especially anxious that the science and technology content of the U.S. preparatory paper, and of the conference itself, be high. There is concern expressed by many leaders and groups of the S&T community that political and economic issues will overshadow the S&T content; there is a concerted drive not to let this happen.

I believe we in the U.S. are in the midst of yet another transition, one of which we can be proud, as we help others, and they help us in tackling the quite surmountable problems of population, health, food, energy, resources, cultural and artistic growth and preservation. Development cooperation is one of the inventions of this century to help attack those problems. Science and technology are important components of that cooperation. I hope your oversight role of the U.S. portion of the S&T contribution to development is as satisfying to you as it is necessary to the effort.

#### U.N. STUDY ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

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Senator STEVENSON. Thank you, sir.

Dr. AVERCH, will you go next?

Dr. AVERCH. Thank you, Senator Stevenson and Senator Schmitt.

I am pleased to appear to discuss the U.N. Conference. Development has been a long personal interest of mine, as well as a professional one.

I thought I would review for you what we believe about the process of development, I believe we have discussed the fact that it is a "systems" problem, if you will.

When I was writing my dissertation on the development process 15 years ago, we were very concerned about means of increasing the quality and quantity of a nation's capital stock. By that I mean physical goods to make other goods.

In the 1960's, we focused heavily on the quality of the labor force, education, transportation, et cetera. And now in the 1970's, we are very concerned about the infrastructure required for development, including the scientific and technological infrastructure.

It's fair to say we still have no satisfying theory or explanation of the development process. We do understand that capital deepening, the emergency of a modern labor force, and adequate infrastructure are probably all necessary conditions for development.

We have no prescribed sequence for achieving those necessary conditions. Nor do we really know what conditions might be necessary and sufficient.

It is highly doubtful that any one thing by itself, including a more efficient and effective science and technology infrastructure, will achieve development. If research and development leads to potential applications for development, we still have to have the capital to realize the application. And we need a trained labor force to implement and manage the development.

For example, to make "miracle" rice viable in Southeast Asia, you have to create a demand for irregularly shaped grains. You have to use fertilizer which has to be produced. This requires capital. Alternatively it must be imported which requires foreign exchange. If you require foreign exchange, you need to export.

For all of these reasons, development is a process that takes time. We see many cases of nations compressing the time required, but still it cannot be advanced as fast as many of us would like.

Let me turn now to the specific questions the subcommittee posed to the NSF.

First, what should be the immediate and longer range goals of the Conference?

I believe there might be three goals. First, the incremental contributions of science and technology to development need to be more rigorously stated and explained. By incremental, I mean that our statements and explanations must make it clear that other factors contribute and are necessary. As the first panel mentioned, science and technology are necessary, but not sufficient conditions.

Second, we should seek to understand the Third World view of development and the nature of demands for Western, or I should say Northern, science and technology. If there is a match between what we can supply effectively and valid, well-grounded demands, then the product of the Conference might be agreed-on guidelines for S. & T. development and for technology transfer. As Dr. Stever noted, this is

a controversial subject. Over the long run, both we and the LDC's might check programs and policies against such guidelines.

Third, very importantly, we need to do everything possible we can to have the Conference focus on economic and social development and on mutuality of interest, rather than political confrontation.

Given these goals, it seems to me that the scientific, academic, the knowledge sectors, in general, have the following responsibilities.

They must provide tough-minded analysis of the social benefits and costs of particular programs to enhance the science and technology infrastructure. Economic costs are important, but we have to consider other costs. The science and technology infrastructure includes patterns of thought and habits of work which can be highly destabilizing to a culture, and at a times, to its political leadership.

Further, the distribution of benefits from an enhanced S. & T. infrastructure may be highly skewed. A few may reap high benefits. Such a skewed distribution may conflict with other policy objectives of both the United States and the LDC's, just as historically there have been tensions between science and other values in the United States and other developed countries.

The knowledge sector must also be willing to participate in whatever programs emerge and are agreed to. Those programs will, of necessity, involve less direct governmental technical assistance and much more informational and educational exchange. There will have to be stronger interaction between the Government, knowledge, and industrial sectors. Certainly the incentives for such involvement will have to be strengthened in the scientific community. In part, what we are speaking of is a view of science itself as a tool of action or policy. And this view has not been embodied so far as a major motivation for the scientist, as scientist.

Because of its broad network of relations with the Scientific and Technical communities, the National Science Foundation has been involved in preparations for the Conference from the beginning. We have established good working relations with Ambassador Willkowski and her staff as well as with the other groups in State concerned with the Conference and in the OSTP.

These relations have the following form:

First, where State is considering proposals from the science and technology community relevant to the Conference, we provide scientific and technical review. Second, in support of the Conference preparations, we have issued a program solicitation for studies, from the academic, nonprofit, or profit sectors, designed to be useful in preparing the U.S. country paper and beyond. And those papers can be used for preparing, as Dr. Stever said, the "nuts and bolts." I have provided copies of this solicitation to the subcommittee.

Third, when all the studies and country papers have been received, there will be a problem of integration and analysis. We have offered to assist Ambassador Willkowski and her staff in doing this job as they have assisted us in the design of the program solicitation. Although some of the work involved in these preparations is new to the NSF, we warmly welcome the opportunity to participate. I believe our work on the conference enhances our capabilities to address the issues of science and technology and economic development.

The subcommittee posed one specific question about the transfer of appropriate technology. I would like to use the issue of appropriate technology to illustrate some of the requirements for a successful conference and aftermath that I mentioned above.

First, we need rigorous analysis of the very concept. From time to time, appropriate technology is spoken of as decentralized technology, as appropriate to the labor/capital mix in LDC's, as low-cost, but efficient technology. It would be a happy occurrence if all these properties happened to reside in a technology we were able and we wanted to transfer.

The probability of such an occurrence does not seem very great. Solar systems technology for remote villages in LDC's may be decentralized, but it may not be cheap or simple, and the kind of indigenous technical labor required to maintain such systems may not exist.

Further, LDC's often see appropriate technology as second-best technology, as the discard of the industrial nations, or disparage it as a plot by the developed nations to prevent development. While the LDC's desire assistance in the best choice of technology, they find preconceptions in the current discussion about appropriate technology, and they are resistant to these.

In any case, development is a dynamic process. Its purpose is to change labor/capital ratios, to upgrade the labor force, to create entrepreneurship and risktaking enterprise. It seems to me that we have to think about a series or sequence of appropriate technologies. And we have to examine their impact on the processes of economic and social development. But all of this, and more, still remains to be done by the scientific and technical communities. I think we have begun, but there is still a long way to go.

Given that we can solve these conceptual problems in the transfer of appropriate technology, we then have to implement the transfer. The proportion of private sector actors in these transfers will, and should be, much higher than we are used to in traditional technical assistance projects.

Government assistance in building dams, roads, and communication facilities may not always be as effective as we would like, but we know how to do it. The provision of incentives to the private sector for the transfer of appropriate technology is not something we know how to do well today.

My point is then that we still have much work to do in understanding what is truly appropriate technology and in understanding its true impact on the development process. And we need to think more about appropriate mechanisms for implementation.

I think that this is legitimate work for the scientific, professional, and technical communities.

Mr. Chairman, this concludes my formal remarks. I will be happy to answer any questions.

[The statement and attachment follows:]

STATEMENT OF DR. HARVEY AVERCH, ASSISTANT DIRECTOR FOR SCIENTIFIC, TECHNOLOGICAL AND INTERNATIONAL AFFAIRS, NATIONAL SCIENCE FOUNDATION

Mr. Chairman and Members of the committee: I am pleased to appear before you to discuss United States preparations for the UN Conference on Science and Technology for Development. Before addressing the specific questions you

have posed, I believe it is appropriate to give a brief overview of what we believe today about the development process.

Fifteen years ago, when I was writing my dissertation on the development process, we were very concerned about means of increasing the quality and quantity of a nation's capital stock. We thought this would be the key factor in development. In the 1960's we focused heavily on the quality of the labor force, education, transportation, etc. And now in the 1970's we focus heavily on the acquisition of infrastructure required for development, including the scientific and technological infrastructure.

We still have no satisfying theory or explanation of the development process. We do understand that capital deepening, the emergence of a modern labor force, and adequate infrastructure are probably all necessary conditions for development. But we have no prescribed sequence for achieving those necessary conditions. Nor do we really know what conditions might be necessary and sufficient.

It is highly doubtful that any one thing by itself, including a more efficient and effective science and technology infrastructure, will achieve development. If research and development leads to potential applications for development, we still have to have the capital to realize the application. And we need a trained labor force to implement and manage the development. For these reasons development takes time; while many nations have compressed this time, the process still cannot be advanced as fast as many would like.

In this light let me turn to the specific questions the Subcommittee posed to the National Science Foundation. What should be the immediate and longer range goals of the Conference? I believe there might be three goals. First, the incremental contributions of science and technology (S&T) to development need to be more rigorously stated and explained. By incremental I mean that our statements and explanations must make it clear that other factors contribute and are necessary—that science and technology are necessary, but not sufficient conditions. Second, we should seek to understand the third-world view of development and the nature of demands for Western science and technology. If there is a match between what we can supply effectively and valid, well-grounded demands, then the product of the Conference might be agreed-on guidelines for S&T development and for technology transfer. Over the long run both we and the LDC's might check programs and policies against such guidelines. Third, everything possible must be done to have the Conference focus on economic and social development and on mutuality of interest, rather than political confrontation.

Given these goals, it seems to me that the scientific academic, the knowledge sectors, in general, have the following responsibilities. They must provide tough-minded analysis of the social benefits and costs of particular programs to enhance the science and technology infrastructure. Economic costs must be considered, but so, too, must other costs. Science and technology infrastructure includes patterns of thought and habits of work which can be highly destabilizing to a culture, and at times, to its political leadership. Further, the distribution of benefits from an enhanced S & T infrastructure may be highly skewed. Such a skewed distribution may conflict with other policy objectives of both the U.S. and the LDC's. There have been and will continue to be tensions between scientific and technical objectives and values and other objectives and values in the LDC's just as there have been in the United States and other developed countries.

These sectors must also be willing to participate in whatever programs do emerge. Those programs will, of necessity, involve less direct government technical assistance and much more informational and educational exchange. There will have to be stronger interaction between the government, knowledge, and industrial sectors. Certainly the incentives for such involvement will have to be strengthened in the scientific community. In part, what we are speaking of is a view of science itself as a tool of action or policy. And this view has not been embodied as a major motivation for the scientist as scientist.

Because of its broad network of relations with the scientific and technical communities, the National Science Foundation has been involved in preparations for the Conference from the beginning. We have, I believe, established good working relations with Ambassador Wilkowski and her staff as well as the other groups in State concerned with the Conference. These relations have the following form:

First, where State is considering proposals from the science and technology community relevant to the Conference, we provide scientific and technical review. Second, in support of the Conference preparations, we have issued a program solicitation for studies which are designed to be useful in preparing the U.S.

country paper in providing background to the U.S. delegation. These studies should also provide a start at the design of specific programs, I have provided copies of this solicitation to the Subcommittee. Third, when all the studies and country papers have been received, there will be a problem of integration and analysis. We have offered to assist Ambassador Wilkowski and her staff in doing this job as they have assisted us in the design of the program solicitation. Although some of the work involved in these preparations is new to the NSF, we warmly welcome the opportunity to participate. I believe our work on the Conference enhances our capabilities to address the issues of science and technology and economic development.

The Subcommittee posed one specific question about the transfer of appropriate technology. I would like to use the issue of appropriate technology to illustrate some of the requirements for a successful conference and aftermath that I mentioned above. We need rigorous analysis of the very concept. From time to time, appropriate technology is spoken of as decentralized technology, as appropriate to the labor/capital mix in LDC's, as low-cost, but efficient technology. It would be a happy occurrence if all these properties happened to reside in a technology we wanted to transfer. The probability of such an occurrence does not seem very great. Solar systems technology for remote villages in LDC's may be decentralized, but it may not be cheap or simple, and the kind of indigenous technical labor required to maintain such systems may not exist.

Further, LDC's often see appropriate technology as second-best technology, as the discard of the industrial nations, or disparage it as a plot by the developed nations to prevent development. While the LDC's desire assistance in the best choice of technology, they find preconceptions in the current discussion about appropriate technology, and they are resistant to these.

In any case, development is a dynamic process. Its purpose is to change labor/capital ratios, to upgrade the labor force, to create entrepreneurship and risk-taking enterprise. It seems to me that we have to think about a series or sequence of "appropriate" technologies. And we have to examine their impact on the processes of economic and social development. But all of this, and more, still remains to be done by the scientific and technical communities. We have begun, but there is still a long way to go.

Given that we can solve these conceptual problems in the transfer of appropriate technology, we then have to implement the transfer. I believe the proportion of private sector actors in these transfers will, and should be, much higher than we are used to in traditional technical assistance projects. Government assistance in building dams, roads, and communication facilities may not always be as effective as we would like, but we know how to do it. The provision of incentives to the private sector for the transfer of appropriate technology is not something we know how to do well today.

My point is then that we still have much work to do in understanding what is truly "appropriate" technology and in understanding its impact on the development process. And we need to think more about appropriate mechanisms for implementation. I think that this is legitimate work for the scientific, professional, and technical communities.

Mr. Chairman, this concludes my formal remarks. I will be happy to answer any questions.

Program Solicitation

**POLICY RELATED STUDIES ON  
SCIENCE AND TECHNOLOGY  
FOR DEVELOPMENT**

Closing Date: December 30, 1977



**NATIONAL SCIENCE FOUNDATION**  
**Directorate for Scientific,**  
**Technological, and International Affairs**  
**Division of International Programs**

# POLICY RELATED STUDIES ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Division of International Programs (INT)  
Directorate for Scientific and Technological Affairs (STIA)  
National Science Foundation

## SUMMARY

The United Nations Conference on Science and Technology for Development (UNCSTD) is scheduled to be convened in August 1978. In support of the Department of State and the U.S. Delegation, the Division of International Programs (INT), National Science Foundation (NSF), intends to provide up to \$400,000 to \$500,000 for studies related to conference agenda items. Individual study projects will each consist of (1) the preparation of a Study Paper(s) analyzing issues and identifying options related to UNCSTD agenda items; (2) the conduct of a small workshop at which the Study Paper(s) will be discussed and reviewed by peers, and (3) the preparation of a final manuscript of the Study Paper(s) in a format suitable for publication. Projects should aim at integrating existing knowledge and experience rather than original research.

Proposals are invited from academic institutions, nonprofit institutions, for profit organizations, or combinations of such institutions. NSF expects to make approximately 15 to 20 awards, the exact number depending on the quality of the proposals received.

Proposals must be received by the Central Processing Section of the National Science Foundation by 5:00 p.m. EST, December 30, 1977. Awards will be in the form of grants or contracts as appropriate. Project starting dates will be approximately 45 days later. Study Papers must be delivered to the National Science Foundation, Division of International Programs, on or before June 1, 1978. Final manuscripts in the prescribed format will be due September 1, 1978, the final reporting date for all projects under this solicitation. Requests for additional support or continuation of awards made under this solicitation will not be considered.

## PROGRAM OBJECTIVE

Projects supported under this solicitation should contribute directly to U.S. preparation for the UNCSTD. The anticipated contribution is two-fold: (1) the production of Study Papers for use by the U.S. delegation to UNCSTD that address issues and options related to conference agenda items and (2) the promotion and improvement of consensus or clarification of important differences on these issues.

It is not intended that projects should undertake collections of new data. Making use of existing information and data collections, project directors should identify and assess the issues and options.

Preliminary draft study paper(s) will be due 10 months after awards become effective. Twenty-five copies should be submitted. Late delivery of Study Papers to INT will greatly diminish their usefulness.

Following the submission of the Study Paper(s), a workshop involving a small number of persons (approximately 10 to 20 persons) who are professionally recognized peers in the subject area(s) is to be convened by the project director.

At this workshop the Study Paper(s) which have been distributed in advance will be discussed. From inputs obtained from this workshop, the original draft study will be either revised or supplemented with additional information. The final manuscript and 100 copies will be prepared in the format prescribed in Appendix C and delivered to NSF. Final manuscripts will be made available by NSF to the public through the National Technical Information Service (NTIS). Other publication is encouraged.

Study projects supported under this program solicitation should relate to UNCSTD agenda items. This agenda, as specified in Council Resolution 2028 (LXI), includes the following

three items

**"(1) Science and Technology for development:**

- (a) The choice and transfer of technology for development,
- (b) Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for development of all countries, particularly for their use in developing countries;
- (c) Methods of integrating science and technology in economic and social developments,
- (d) New science and technology for overcoming obstacles to development.

**"(2) Institutional arrangements and new forms of international cooperation in the application of science and technology:**

- (a) Building up and expanding institutional systems in developing countries for science and technology,
- (b) Research and development in the industrialized countries in problems of importance to developing countries;
- (c) Mechanisms for exchange of scientific and technological information on experiences significant to development,
- (d) Strengthening of international cooperation among all countries and the design of concrete new forms of international cooperation in the field of science and technology for development;
- (e) Promotion of cooperation among developing countries and role of developed countries in such cooperation.

**"(3) Utilization of the existing United Nations system and other international organizations.**

Utilization of the existing United Nations system and other international organizations to implement the above goals in a coordinated and integrated manner."

**PROBLEM AREAS AND ISSUES**

On the basis of these agenda items, the six foci for studies that are given below have been identified. Individual studies should relate to one

or more of these principal foci. The focus that has been selected should be made explicit on the cover page of proposals and subsequent material in order to facilitate both the review of proposals and the utilization of study results.

The lists of issues given below are suggestive and not exhaustive; studies on other issues related to UNCSTD agenda items will be considered for support.

**TOPIC 1. Relationship Between S&T and Development**

From existing studies and past experience, to what extent is the social and economic development of LDCs dependent upon their science and technology base as compared with other factors?

**TOPIC 2. Obstacles/Opportunities**

2.1 What seem to be the major obstacles in utilizing indigenous science and technology in economic and social development in LDCs? What seem to be the major obstacles to technology transfer to developing countries? How can these obstacles be overcome?

2.2 In what ways can we more accurately predict and ameliorate the potential adverse environmental consequences of development activities in those LDCs that are concerned about environmental impacts? What importance should be assigned to identifying or developing technologies for adaptation in LDCs with less potential for pollution and environmental degradation?

**TOPIC 3. Flow and Utilization of S&T**

3.1 What contribution has the indigenous science and technology community in the more advanced LDCs made to industrial and agricultural development?

3.2 How can advanced countries share scientific knowledge and technology with LDCs to deal with basic human needs—public health, transportation, education, nutrition, and productive employment?

3.3 What has been the impact of LDC science and technology base on their industry? What is the relation between indigenous science and technology and foreign industrial efforts with LDCs?



#### TOPIC 4. LDC Infrastructures

4.1 What are the essential components of the infrastructure necessary to the growth/maintenance of LDC indigenous capabilities in science and technology, including research and development? Which LDCs have had particular success in developing that infrastructure, and are there elements of their experience applicable to other countries?

4.2 What measures have or can be taken in developing countries to provide the training and skills to choose, operate or adapt new technology, and in what ways can the advanced countries help? What measures have been taken to identify appropriate technologies and with what effect?

4.3 What kind of institutions in LDCs provide the infrastructure needed for development or transfer of knowledge and technology? What functions must such institutions perform to be successful? How can advanced countries expedite the development of such institutions and their capabilities?

4.4 What institutional arrangements or practices can be encouraged to relate the interest and capabilities of the LDCs science and technology community to those of the commercial, industrial, agricultural, educational and governmental communities?

#### TOPIC 5. Developed Country Contributions

5.1 What technologies are now available in the U.S. public domain which can be adapted to the needs of developing countries and how can this be done efficiently? How can LDC access to and use of such technologies be improved?

5.2 What have been the effective and efficient roles and activities of developed country institutions (government and nongovernment) in strengthening LDC science and technology infrastructures? Are there successful experiences with lessons for other countries?

5.3 What mechanisms or methodologies exist or can be developed to aid in the adaptation of transferred technologies to the socio-economic-cultural environment of the receiving LDCs?

5.4 In what ways have or can technical assistance contribute efficiently to the transfer and adaptation of public sector technologies?

#### TOPIC 6. International Structures

6.1 How can the organizations of the UN system be more supportive and complementary in their respective roles of mobilizing science and technology for development of the LDCs?

6.2 How can other international organizations (government and nongovernment) play a greater role in mobilizing the science and technology capabilities of LDCs for development?

6.3 How can regional institutions play a significant role in expediting technology transfer activities through such activities as education and training, dissemination of information, and making available needed expertise?

#### GENERAL INFORMATION

**Number, duration and type of award:** Approximately 15 to 20 awards may be made for studies to be conducted for a period not to exceed 7 months. Copies of a progress report and an initial survey of available information will be due April 1, 1978 and a draft Study Paper June 1, 1978. Final reports are due September 1, 1978.

There is no commitment to make any specific number of awards, however, and the exact number will depend upon the quality of the proposals submitted. Cost-sharing or fees may be negotiated as appropriate. Awards will be in the form of NSF grants unless a fee is appropriate, in which case a contract will be negotiated. Awards may provide for full costs if appropriate.

**Starting dates of awards:** Government financed work should not begin before there is an approved award by the Grants Officer or Contract Officer. Recovery of costs incurred before the effective date is seldom authorized. In view of the compacted scheduling inherent in this proposed projects, NSF will, to the extent compatible with its proposal review and processing responsibilities, endeavor to assist in the maintenance of the intended time frames.

**Who may submit proposals:** Proposals are invited from nonprofit and for profit organizations or combinations of such organizations.

**Proposal due date:** Proposals must be received by the Central Processing Section of the National Science Foundation by 5:00 p.m. EST on December 30, 1977, in order to be considered. Proposals will be considered firm until March 30, 1978.

Proposals and/or modifications thereof, which are received after 5:00 p.m. on the date indicated above, are late proposals. Late proposals will not be considered unless the Foundation determines that such action would not unduly delay awards and would be in the best interests of the Government. Normally, only late modifications lower in cost or offering other more favorable factors which do not require a technical reevaluation will be considered. The Foundation's decision is final and conclusive. Except as otherwise expressly stated in the modification, a late modification, if rejected, will not disqualify an offeror's timely proposal.

**Report schedule.** A progress report will be required on April 1, 1978, and a draft Study Paper on June 1, 1978. The final report in the format given in Appendix 3 plus 100 copies will be required by September 1, 1978. All reports should be submitted to the NSF Division of International Programs.

**Mailing information:** Formal proposals, in 10 copies, should be addressed or delivered to:

Central Processing Section, Room 22J  
National Science Foundation  
1800 G Street, N.W.  
Washington, D.C. 20550

Attention: UNCSTD Solicitation

INT-STIA Topic Number(s) \_\_\_\_\_

Proposals should be fastened in the upper left-hand corner. Please do not use covers or binders, and do not include any extraneous material.

Return postcards are printed on the back cover of this Solicitation. To facilitate prompt acknowledgment of the proposal package at its destination, two of the postcards should be addressed and attached to a copy of the proposal. The proposal number assigned by the Foundation will be used in correspondence to identify the proposal. If an acknowledgment card with the proposal number endorsed upon it is not received within 2 weeks of the closing date, the submitting organization should promptly telephone to request a tracer (Mrs. Lucas, Central Processing, 202-632-4120).

**First time applicants:** If your organization has never received an NSF award, or has not received one within the past 2 years, it is important that:

a. Its officials become familiar with the contents of the NSF Grant Policy Manual, NSF 77-47, a compendium of policies and procedures

applicable to administration of NSF grants. Knowledge of its contents is a necessity for managing NSF grants, and it may be obtained by direct subscription with the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402 at \$12.00 domestic and \$15.00 foreign. The Manual must be ordered through the NSF 77-47 designation, and it is in looseleaf format. Periodic updating through supplements are only available through a GPO subscription. Although applicable to grants the Manual contains informative guidelines generally applicable to other type NSF awards.

b. Your organization must submit basic information regarding structure and management as outlined in Appendix D. This data should be submitted directly and separately about the same time you submit your first formal proposal, to NSF Division of Grants and Contracts, Attn: SEA/STIA Branch, Room 201, 1800 G St. N.W., Washington, D.C. 20550. Since time is of the essence in this solicitation, timely receipt of all the information called for in the Appendix D will expedite the decision process regarding the support of the proposed project.

## APPLICATION PROCEDURES

Each proposal should contain the following elements:

**Cover Sheet.** A cover sheet is required in the form specified in Appendix A.

**Abstract.** Following the cover page there should be a one-page abstract summarizing the narrative section.

**Narrative.** A narrative description (not to exceed 15 double-spaced, nonreduced pages) of the proposed research in the following format:

- 3.1 **Identification of Problem.** A brief statement identifying the pertinent UNCSTD agenda items (see page 1.2) and indicating the specific focus of the study.
- 3.2 **Study Plan.** A detailed description of the procedures and methods to be followed in carrying out the study, including a description of how the existing information and research will be assessed and integrated.
- 3.3 **Facilities.** A description of the facilities available to the proposer for carrying out the proposed study.

- 3 4 **Workshop** A description of the plan for identifying peers to participate in the "workshop phase" of the project. Names of individuals should be given if known and whether they will be paid anything beyond travel and per diem should be indicated.

**Resumes.** Resumes of the principal investigator or project manager and other key persons, including education, applicable experience and a list of relevant publications must be included.

**Budget.** An estimated budget is required, in the form called for in Appendix B. The budget page should be tabbed and labeled "budget."

**Other Sources of Support.** Each proposal must list all current research, in addition to the proposed project, to which the principal investigator(s) and other senior research personnel have committed a portion of their time, whether or not salary for the person involved is included in the budgets of the various projects. This information should include the titles and dates of current grants or contracts, the source of funds, annual budget levels and the man-months devoted to each project by each of the senior personnel. The proposal must also provide analogous information for all other proposed projects which are being considered by, or which will be submitted in the near future to other possible sponsors including Foundation programs. Concurrent submission of a proposal to other organizations will not prejudice its review by the Foundation. This section should be tabbed and labeled "Other Sources of Support."

### EVALUATION OF PROPOSALS

Proposals will be reviewed in detail by one or more review panels that will include NSF Staff, experts from other U.S. Government agencies and external consultants. Proposals recommended for award by the review panel(s) may be subject to negotiation, and may result in minor revision of the proposal through consultation between the proposers and NSF. However, decisions on awards are primarily based upon the original proposal submitted. Final decision concerning the support will be made by the NSF.

The Foundation will select for award those proposals offering the greatest total value. The estimated cost will be considered in making this determination, but the primary basis for selec-

tion will be the following criteria, weighted approximately equally.

1. Significance of the proposed study for policy makers, including:
  - 1 1 The relative importance of the particular topic on which the study will focus;
  - 1 2 Likely importance of the study to the U.S. negotiating team and UNCSTD, and
  - 1 3 Evidence that presentation of the findings will be in a form understandable to and useful to policymakers.
2. Quality of the proposed study design, including:
  - 2 1 Evidence of a thorough knowledge of pertinent literature and related research,
  - 2 2 The adequacy of the design and methods for accomplishing the study; and
  - 2 3 Specificity and adequacy of the techniques proposed.
3. Likelihood of the success of the project as evidenced by:
  - 3 1 A comprehensive plan for organizing the study;
  - 3 2 The experience and past performance of the proposers, and
  - 3 3 The adequacy of the facilities and arrangements available for coordinating the study.

### ADMINISTRATION

The award competition is administered by the Division of International Programs, Scientific, Technological and International Affairs Directorate, of the National Science Foundation. Due to considerations of equity, telephone calls and other contacts concerning the Solicitation are discouraged. Comments on the merit of particular proposals or research ideas will not be made. Persons inquiring as to the status of a proposal prior to formal notification of the Foundation's action thereon will be told only that the proposal is under consideration.

### ACCESS TO PEER REVIEW INFORMATION

After final decisions have been announced, the Foundation will, upon request, inform the project

director of the reasons for its decision on a proposal. Verbatim copies of reviews, not including the identity of the reviewer, will be made available to respective project directors upon specific request.

#### RIGHTS TO PROPOSAL INFORMATION

If a proposal results in a Foundation award, the proposal becomes an integral part of the record of the transaction and may be made available to the public upon specific request. Information or materials which the Foundation and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the "Freedom of Information Act" (Public Information Act of 1966 as amended 5 U.S.C. 552). Accordingly, privileged information (e.g. proprietary scientific information, salaries of key personnel, or other information which the

proposer desires to be treated in confidence) should be included in a separate statement bearing a legend similar to the following: "Following is (proprietary) (specify) information which (name of proposing organization) requests not be released to persons outside the Government, except for evaluation purposes." Without assuming any liability for inadvertent disclosure, NSF will seek to limit dissemination of such information to its employees and, where necessary, for evaluation of the proposal, to outside reviewers. In any case, NSF will not be limited in using similar information obtained without restriction from another source.

A proposal which does not result in an award will be retained by the Foundation for a limited time and will be released to the public only with the consent of the proposer or to the extent required by law. Proposals for research requiring security classification normally will not be considered.

**APPENDIX A**  
**PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION**  
 Cover Page

FOR CONSIDERATION BY NSF ORGANIZATIONAL UNIT (please specify)		
PROGRAM ANNOUNCEMENT/SOLICITATION NO	CLOSING DATE (IF ANY)	
NAME OF SUBMITTING ORGANIZATION TO WHOM AWARD SHOULD BE MADE (INCLUDE BRANCH/CAMPUS/OTHER COMPONENTS)		
ADDRESS OR ORGANIZATION (INCLUDE ZIP CODE)		
TITLE OF PROPOSED PROJECT		
REQUESTED AMOUNT	PROPOSED DURATION	DESIRED STARTING DATE
PI/PD NAME AND SOCIAL SECURITY NO (SSN)*		PI/PD PHONE NO
PI/PD DEPARTMENT		PI/PD ORGANIZATION
ADDITIONAL PI/PD AND SSN*	ADDITIONAL PI/PD AND SSN*	
ADDITIONAL PI/PD AND SSN*	ADDITIONAL PI/PD AND SSN*	
FOR RENEWAL OR CONTINUING AWARD REQUEST, LIST PREVIOUS AWARD NO		
REMARKS *Submission of social security numbers is voluntary and will not affect the organization's eligibility for an award. However, they are an integral part of the NSF information system and assist in processing the proposal.		
<b>PRINCIPAL INVESTIGATOR/ PROJECT DIRECTOR</b> NAME  SIGNATURE  TITLE  DATE	<b>AUTHORIZED ORGANIZATIONAL REP</b> NAME  SIGNATURE  TITLE  DATE	<b>OTHER ENDORSEMENT (optional)</b> NAME  SIGNATURE  TITLE  DATE

# **APPENDIX B** **SUMMARY** **PROPOSAL BUDGET**

ORGANIZATION AND ADDRESS				FOR NSF USE ONLY			
				PROPOSAL NO.			
PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR				DURATION (MONTHS)			
				PROPOSED		REVISED	
NSF USE	A SENIOR PERSONNEL (LIST BY NAME; SHOW NUMBERS OF PEOPLE IN BRACKETS; SALARY AMOUNTS MAY BE LISTED ON SEPARATE SCHEDULE) GPM 205 1d			NSF FUNDED MAN MONTHS	FUNDS REQUESTED BY PROPOSER	FUNDS GRANTED BY NSF (IF DIFFERENT)	
	1 P I / P D	CAL	ACAD	SUMR			
	2 CO P I / P D				\$	\$	
	3 CO P I / P D				\$	\$	
	4 CO P I / P D				\$	\$	
	5 CO P I / P D				\$	\$	
	SUBTOTALS A1 A5				\$	\$	
	FACULTY AND OTHER SENIOR ASSOCIATES (ATTACH EXCEL SHEET IF NECESSARY)				\$	\$	
	7				\$	\$	
	8				\$	\$	
9				\$	\$		
10				\$	\$		
11				\$	\$		
11115	SUBTOTALS A7 All				\$	\$	
B OTHER PERSONNEL (LIST NUMBERS IN BRACKETS)				\$	\$		
11141	1 ( ) POSTDOCTORAL ASSOCIATES				\$	\$	
11149	2 ( ) OTHER PROFESSIONALS				\$	\$	
11150	3 ( ) GRADUATE STUDENTS				\$	\$	
11152	4 ( ) UNDERGRADUATE STUDENTS				\$	\$	
11182	5 ( ) SECRETARIAL CLERICAL				\$	\$	
11183	6 ( ) TECHNICAL, SHOP, OTHER				\$	\$	
TOTAL SALARIES AND WAGES (A+B)				\$	\$		
11200	C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)				\$	\$	
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				\$	\$		
D EQUIPMENT (LIST ITEMS AND DOLLAR AMOUNTS FOR EACH ITEM)				\$	\$		
TOTAL EQUIPMENT				\$	\$		
23181	E MATERIALS AND SUPPLIES				\$	\$	
32630	F DOMESTIC TRAVEL				\$	\$	
42111	G FOREIGN TRAVEL (LIST DESTINATION AND AMOUNT FOR EACH TRIP; GPM 231)				\$	\$	
42112					\$	\$	



## APPENDIX C

## GUIDELINES FOR PREPARATION OF REPORTS

**PAPER SIZE:** Use only (8½" x 11") or (8" x 10½") size paper. Avoid the use of oversized pages such as foldout tables, blue-prints, computer printouts, etc. If such materials cannot be reduced to standard size pages without losing legibility, they should be subdivided into parts that will fit on standard size pages.

**TITLE PAGE:** Each report (or separately bound part of a report) should begin with a title page containing at least the following:

1. The full title (and subtitle) of the report
2. The grant or contract number(s)
3. Date of the report
4. The name of the principal investigator(s)
5. The name and address (including zip code) of the performing organization
6. A disclaimer

**DISCLAIMER:** A statement attributing the report to the research performer and not to the National Science Foundation should be included on the title page. A sample statement follows.

Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

**ABSTRACT:** An informative abstract of approximately 175 words should be included. Preferably, the abstract should be on a separate page immediately preceding the first section of the report.

**TABLE OF CONTENTS:** A comprehensive, accurately numbered Table of Contents should be included.

**PAGINATION:** All pages in the report (or in each separately bound part of a report) should be consecutively numbered. All diagrams, table and appendices should be included in the numbering. The beginning page numbers of report sections, and other significant inclusions (appendices, figures, etc.) should appear in the Table of Contents.

**LEGIBILITY:** Be sure that report copies submitted to NSF are suitable for preparing legible photocopy and microfilm reproductions. Avoid the use of colored inks, half-tone photographs, small print, computer printouts, poor reproductions, and other features that would prohibit the reproduction of legible, useable copies.

**REPRODUCTION RESTRICTIONS:** Normally, publications produced under government grant or contract support may be freely reproduced by the government for its use. Therefore, unless special written permission has been obtained, reports should not be copyrighted, or contain any printed restriction concerning its reproduction or use. Further, if extracts of copyrighted material are to be included within a report (such as journal reprints or published illustrations), permission to include this material should be obtained beforehand from the copyright holder and notice of such permission included in the report.

**SPECIAL PROBLEMS AND QUESTION:** Any special problems or questions concerning the preparation of reports to be submitted to the RANN Program should be addressed to:

UN Conference Studies  
Division of International Programs  
National Science Foundation  
1800 G Street, N.W.  
Washington, D.C. 20550  
Telephone (202) 634-7930



## APPENDIX D

### First-Time Applicant and/or Performing Organization

If an applicant has not received a NSF grant/contract within the past 2 years, the applicant must submit the following information set forth in attachment (1) Said applicant must complete the attached "Assurance of Compliance Statement"

The information requested above should be submitted to

SEA/STIA Branch, Room 201  
Division of Grants and Contracts  
National Science Foundation  
Washington, D C 20550

### Organization Management Information

Please forward the following information, documents, or statements (Items 1 through 6 apply to all organizations. Remaining items apply as appropriate.)

- 1 The commonly-used name of your organization, together with the legal (registered) name. If the legal name of the organization is different from that normally used, or if there has been a recent change in name due to merger or other reasons, please clarify. If appropriate, identify and give relationship to any parent organizations, subsidiaries, predecessors, affiliated entities, etc. Any expected changes in your organization should also be noted.
- 2 An official or published statement of the major purposes of your organization and of the powers which have been granted to it to enter into contractual relationships and/or to accept grants (e.g., articles of incorporation, terms of reference, or by-laws). This should include a brief resume of your organization (when organized, number of permanent, full time and other personnel currently employed, and an organization chart).
- 3 A description of the policies and procedures of your organization for the management of such projects as those for which NSF assistance is being requested and for the management of Federal funds (see Chapter V of the NSF Grant Administration Manual). Indicate whether or not the financial aspects of such projects normally are audited either by your organization or by an external organization (specify name of external organization and submit a copy of latest audit report).
- 4 The name, title, address, telephone number, employment relationship to your organization, and other employment for the following personnel, and their alternates (see Glossary of Grant Manual for definitions).
  - a. Authorized Institutional Representative
  - b. Business Officer.
  - c. Chief Executive Officer. (NSF grant letters are normally addressed to the Chief Executive Officer unless another appropriate addressee, such as the Authorized Institutional Representative is designated by him.)
  - d. Principal Investigator(s) or Project Director(s) and other Senior Personnel on the project for which financial assistance is being requested.
- 5 A representative listing of current or recent Federal awards to your organization indicating agency, award number, award amount, and title of project; as well as a current listing for the personnel cited under 4 d. above, including the amount of salary support and expiration date.
- 6 A signed copy of the enclosed Assurance of Compliance with NSF Regulations under Title VI of the Civil Rights Act of 1964, notwithstanding the fact that your organization may have submitted a comparable form to some other Federal Agency.

7. A copy of the most recent indirect cost agreement negotiated between your organization and some Federal agency or, if you lack such an agreement, an indirect cost rate proposal as described in paragraph 332 of the Grant Manual. (Please furnish this information separately and directly to the Division of Grants and Contracts' Management and Cost Analysis Office.)

8. Information concerning the policies and practices of your organization relative to the items listed below, including copies of pertinent administrative manuals or policy statements.

- a Vacation and leave, including sabbatical leave, leave with pay, and "release time"
- b Components of your employee benefits
- c Travel, including normal rates for transportation, subsistence and related expenses
- d Subcontracting with other organizations
- e Components of consulting fees paid and hourly rates
- f Patentable or copyrightable research and invention performed under Federal grants by or under the direction of the research or training staff.
- g Insurance of equipment and vehicles
- h Professional appointments, including their terms (e.g., 9 or 12 months), and the effective date of appointment contracts
- i Compensation rates and benefits for various classes of employees including the pay scale and types and rates of benefits
- j Compensation rates and benefits for research assistants and other supporting personnel

9. For nonprofit organizations other than accredited institutions of higher education, a copy of the current Internal Revenue Service tax exemption letter which certifies the organizations not-for-profit status.

10. For organizations other than accredited institutions of higher education or State or local government agencies, a descriptive brochure, prospectus, or comparable document, bank references (if available), and certified statements of financial condition for at least the last 2 years.

11. For profit-making organizations, a signed copy of the enclosed Small Business Declaration indicating whether or not your organization is a small business concern.

12. The following additional information:

#### Small Business Declaration

The company named below ☐ IS, ☐ IS NOT, a small business concern. A small business concern by Government definition is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operation in which it is operating on Government solicitations and can further qualify under the criteria concerning number of employees, average annual receipts, or other criteria, as prescribed by the Small Business Administration. (See Code of Federal Regulations, Title 13, Part 121, as amended, which contains detailed industry definitions and related procedures.)

Dated \_\_\_\_\_

\_\_\_\_\_  
Name of Company

By \_\_\_\_\_

\_\_\_\_\_  
Chief Executive Officer or  
his designee

NATIONAL SCIENCE FOUNDATION  
WASHINGTON, D C. 20550

ASSURANCE OF COMPLIANCE  
with  
NATIONAL SCIENCE FOUNDATION REGULATION  
UNDER TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

..... (Name of Applicant) ..... thereafter called the "Applicant"  
HEREBY AGREES THAT it will comply with Title VI of the Civil Rights Act of 1964 (P L. 88 352) and all requirements imposed by or pursuant to the Regulation of the National Science Foundation (45 CFR Part 611) issued pursuant to that title, to the end that, in accordance with Title VI of that Act and the Regulation, no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives Federal financial assistance from the Foundation, and HEREBY GIVES ASSURANCE THAT it will immediately take any measures necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of Federal financial assistance extended to the Applicant by the Foundation, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which it retains ownership or possession of the property. In all other cases, this assurance shall obligate the Applicant for the period during which the Federal financial assistance is extended to it by the Foundation.

THIS ASSURANCE is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Applicant by the Foundation, including installment payments after such date on account of applications for Federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such Federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign this assurance on behalf of the Applicant.

Dated:..... (Applicant)

By.....  
(President, Chairman of Board, or comparable authorized official)

.....  
(Applicant's mailing address)

Senator STEVENSON. Thank you, sir. You say we still have much work in understanding what is truly appropriate technology.

Are we the appropriate ones to make that decision or those judgments? If so, certainly we have learned much that could be exported from our own mistakes.

Dr. AVERCH. I would agree.

Senator STEVENSON. Doesn't the credibility of the judgments as to what the appropriate technology is require some direct participation in that decisionmaking process by those ultimately receiving it?

Dr. AVERCH. I would think so, Senator Stevenson. But often much of the discussion turns upon the possible export or transfer of high technology and the implementation of capital intensive projects. That is, many countries, in their view of development, see that process as one of perhaps "trickle down" from capital intensive industries, say, steel plants, rather than from appropriate technology, that is technology more adapted to their current labor and capital situation. But I think the matter, truly is a matter of discussion, and that is why I think I should raise the LDC view of appropriate technology.

Senator STEVENSON. I think you should. I don't think there is a great deal of disagreement even among the LDC's as to what is appropriate. They, of course, don't even like that expression, as you indicated.

Dr. AVERCH. There are many paths to development. Consequently, the capital, the labor you need, and the S. & T. that you need are going to be quite different.

Dr. STEVER. Mr. Chairman, if I can comment on that, I think there is an opportunity in the forthcoming Conference to do better on this. As you know, all of the different countries will submit their country reports. Many of them will have some very good treatments of what they consider their principal needs and how to go about meeting them. Many of them can state their need a lot better than they can state how to go about developing the infrastructure they often need to help solve their problems.

I recall speaking to the leader of a developing African country. He could speak as well as any leader of any country about how science and technology could come in to help. For example, knowing that there wasn't going to be a massive irrigation system; he wanted to use solar power to get water out of the wells. And a whole series of things. He understood them very well.

Later, I looked into his science and technology infrastructure. In my opinion it was completely inadequate. He just had to have help there if he was to get the means to reach his goals.

I hope that this Conference will not try to suppress the individuality of the countries. Now, I do know that it is a proper role for the U.N. to try to generalize problems and policies so they can begin to place emphasis on those areas where there is the greatest scope for help. But I do hope the Conference clarifies what each country feels its needs are. That will be a catalog for the rest of the world.

There will be lots of room for bilateral agreements to help on some of these problems. There is a lot to be gained right at this time.

This is a much more knowledgeable world about science and technology than it was 15 years ago.

Senator STEVENSON. I doubt if there will be any expression. Before it is all over, we may wish there was.

I don't mean that seriously.

I think there is a great danger of our making decisions which are, right or wrong, taken up. It is not proper for us to suggest what is proper for them or even to suggest they can't handle these things.

The Brazilians, for example, may be coming on soon with the most advanced steel technology and be able to knock the pants off the Europeans and Japanese, not to mention the United States.

Yet you want to go to this Conference fully prepared and with some ideas which will hopefully be accepted, or at least respected for the spirit in which they are offered.

Dr. STEVER. I agree.

Senator STEVENSON. What I was getting at is whether in this process of defining appropriate technology, there shouldn't be some direct involvement with the LDC's in our preparations before we get to the Conference.

Dr. AVERCH. Senator Stevenson, I believe the design of our preparation involves discussions with the LDC's. I believe Ambassador Wilkowski plans to do that. Also some of the LDC's have requested U.S. assistance in writing their country papers. I believe State is working on that.

Senator STEVENSON. The earlier Conferences offered some guidance, I presume.

Dr. STEVER. Mr. Chairman, we on the NRC study are particularly worried about LDC involvement. We must have a report in by next spring which will be used in the formation of our country paper. This time scale precludes direct approaches to the LDC's. We have had, obviously, contact with some of the representatives of the other countries. In fact, Ambassador Wilkowski mentioned a group that was in the country recently and we talked to them.

On the other hand, we have had to go to many Americans who have had, in fact, that contact themselves. We may be getting it second-hand, but we have found a remarkable number of people who are in pretty good contact with some of these countries and are bringing in their ideas of what they have learned. Developing countries' needs are quite different from what they were 10, 15 years ago.

So I believe our country has learned some of the lessons that you are concerned that we do learn.

Senator STEVENSON. You said that at the time of the 1963 Conference on Science and Technology, the world was barely aware of problems which today dominate our thinking and concerns; specifically, energy supplies, population growth, environmental degradation. Do you have any sense of—I address this to both of you—science and technology problems that are unrecognized today, but are likely to dominate our attention in the future, or are we going to repeat history and make the mistakes of focusing our current efforts on the wrong issues because of lack of foresight.

Dr. STEVER. I think we should have a little foresight. Senator Schmitt brought up the use of satellites. I would hope, for example, that no emerging nation that doesn't already have the kind of complex communications network that we use with all of those telephone poles and wires and ground stations—I would hope that they never have them. I hope that they will have a more modern system. In fact, one of our problems, if and when that happens, will be to

marry into their system. We will have difficulty catching up, in fact. So I would hope that we would look ahead and not try to impose our own systems on them.

I think that the only way you can get at these new ideas is just to increase the number of engineers in the business who are thinking about them and dealing directly with them.

I worry a great deal about the whole process.

The best development comes when some of our scientists and engineers, are in LDC's facing their problems and working with them. That is the best technology exchange of all.

You can send books and information over wires, but personal interchange is the best.

I would hope that we remember that and don't just keep this exchange at high levels of government, that we really get down to the people who are doing the changing.

Senator STEVENSON. In preparing a national position paper for the Conference, are we looking ahead, or are we looking to the present, or just to 1979?

Dr. STEVER. Well, forward thinking is tougher than the here and now, and it often gets submerged. But I would hope that some of the ideas will be sufficiently forward thinking.

By the way, the need for forward thinking applies in the social science areas as well.

You talked about understanding what development needs really are, and so on. We have to understand that, as well as the physical science approach.

We have asked our people to make sure that they understand the constraints that a new science, new technology, introduce to a country, what its secondary effects are.

Obviously, other countries have to decide whether or not to go into a certain area of development, but we should make sure that they understand both the benefits and the risks.

That is harder thinking than just the benefits.

Senator STEVENSON. Dr. Averch?

Dr. AVERCH. You made the point about critical future issues. And I think Senator Schmitt raised one. What we can do for the LDC's, is a function of the health of our R. & D. enterprise. As you know, the resources available to the R. & D. enterprise have gone down, or fluctuated up and down. I think it is a crucial thing to think about for the future.

The United States has always exported high technology to other countries which they have taken up and embodied in products.

We, ourselves, have been sufficiently innovative, to have been able to take up the slack. New industries have come along, based on R. & D. Therefore, the overall economic impact of our technology transfers has been somewhat limited and the social impact limited, as well. If our innovativeness declines, if our R. & D. enterprise is not healthy, then these impacts that we are just now seeing will become greater and greater.

There is a deep concern to those Federal agencies concerned with R. & D. about our innovativeness and our ability to remain innovative and to appropriate the fruits of the research that we do carry out.

I think it is a tough issue for the future.

Senator STEVENSON. Senator Schmitt?

Senator SCHMITT. I agree very, very much. I also agree there needs to be one-on-one contact. That is the way the know-how is transferred.

You can't just send them pieces of paper and the instruction books, thinks like that. You have to be there with it. That is true in any society. That is how we do it here. That is how it is going to be done. That is the way people work best together.

We have had some experience in New Mexico with our State universities, as well as the University of New Mexico in working with Latin-American countries. They come back universally saying that the best results are obtained in the small one-on-one confrontation.

Dr. STEVER. Senator Schmitt, I would like to amend the statement on one-on-one contact slightly, because I think we have to start putting a spotlight on some of our institutions and giving them more clear-cut responsibility in this area of science and technology for development.

For example, our land-grant colleges, those with expertise in agriculture—and particularly desert and arid land agriculture—are working on some of the same problems that many of the LDC's are working on. If we could only get some of our institutions, to build up a greater expertise in the field, and to insure two-way information flow, we would all benefit.

I think if we can do that, we will use our money better. I think we have to start giving some of our institutions a very clear mission in this area so that they understand that the spotlight is on them. Many of them would love it.

Mind you, we also have to give them support.

Senator SCHMITT. I agree, Doctor, and I think the mechanism again could well be through the focus contract with institutions or consortia, to work on a nation's or group of nations' problems, that are combined by some unifying fabric, such as arid land agriculture. I think that would work very quickly.

Again the financial arrangements can be quite variable. They don't have to be just the U.S. Government putting foreign aid dollars in it. It can be through the World Bank, through the financial capability or economic capability of the host country.

Further production, for example, is one way in which you can finance these kinds of operations.

Dr. STEVER. Eighty percent of our technological know-how in this country is in for-profit institutions. If you take the sectors that the NRC panels are covering, you will see that two of those—population, public health and nutrition, and food, water, soil and climate—primarily involve knowledge that is concentrated in public and academic institutions. But the remaining three—energy and natural resources; employment, trade and industrialization; urbanization, communication and transportation—involve a lot of know-how in the profit-making sector.

We have got to find ways of focusing on the profitmaking institutions as well as the not-for-profit private institutions. That is the only way we can still the criticism which I mentioned in my paper.

Many LDC's are blunt. They almost think that we are concealing some of our best technology from the rest of the world by having this system in which we have private intellectual property and know-how concentrated in our private institutions.

Countries like the Soviet Union come through with the same expression. If we are going to contribute, we have to tap that private profitmaking sector of our economy in the next go-round.

Senator SCHMITT. Well, I completely agree with that. But I think there are ways to do it. I think that one way is to make it a profit to work with the developing country in a particular kind of service or industry.

I think there are examples of that. The State Department, I think, may not focus on those examples. There have been examples in Venezuela, where Alcoa has been actively helping the Venezuelans develop a new aluminum processing industry, in the interior.

There are examples in Peru where the oil industry has been under a contract to Petro Peru, to explore the east side of the Andes. So there are examples.

Other countries are doing it also. The Japanese are helping the Peruvians develop the iron ore. So the examples are there also.

I know, from your written testimony, Dr. Stever, that it is clear that your efforts recognize this, although I was going to ask you, don't you think, because of the time frame and also because of the interaction, it might be possible that another panel could crosscut the other five panels?

You call it horizontal ordering. I haven't thought of it in that way, but that is a legitimate definition.

Do you think it is appropriate to begin that effort now or very quickly?

Dr. STEVER. Yes. I think more and more you have to.

We have discovered that this matter of how one taps the private profitmaking institution emerges immediately in all our panel discussions. We have to take a look at that, too.

Senator SCHMITT. Let me ask you also about the creation of a new kind of profitmaking organization. I believe you were here when I was talking about Intelsat. It is an international profitmaking organization.

Countries invest in Intelsat and get a return on their investment as a consequence of that. In addition, they are participating in a communication system which assists them internally and externally.

Would you say that your examination of horizontal ordering would include the examination of international management institutions such as Intelsat?

Dr. STEVER. I think that is a very good suggestion with a lot of potential in some areas.

Senator SCHMITT. I would not presume it would be applicable in every area because each has a different set of constraints and the model must be changed on a county-by-county basis.

You have to modify it. But the idea of an international management system, sometimes on the regional basis, is valid.

Dr. STEVER. One of the great advantages is that they can get enough resources really to tackle the problem. When I was with the National Science Foundation, we found that quite often our resources came out in very small units—a study here, a study there.

The World Bank can do better. They have bigger resources and they tend to go in to larger projects. But the big advantage of the organiza-



tional mechanism you suggest is, on a given subject, it could amass enough resources to make a real difference.

And just not on examples like, aluminum and oil. In some cases, developing these industries helps, but they don't always penetrate deeply enough to some of the more elementary things, like building simple roads. You can establish a very complex industry in a country and still not have the widespread impact that is needed.

So I think we have got to explore whether we can apply these same large-scale efforts to get at some of the simple objectives.

Senator SCHMITT. As a matter of fact, I do not mean to imply that the Alcoa and oil industry experience was even the optimum experience. It is just an example.

I agree with you. I think when you come to a project to establish a ground communications system or a transportation system within a country, you might well use a similar mechanism such as a contract with a large U.S. construction corporation. It doesn't have to necessarily be the development of an aluminum industry. With a cost-plus-fee type of arrangement with a particular time frame and with a particular educational clause for the people to know how to operate it.

The use of the international management organization mechanism I think depends on every participant having a vested interest in making the organization work.

What you have to search for, if it is going to be the horizontal ordering mechanism that you use, is that the participants, regional, global or otherwise will have a vested interest in making it work.

Intelsat has shown clearly, the countries want it, so they make it work.

In your written testimony, it looks like your thoughts are getting close to this.

The climatic change problem is aggravated as our populations increase in various parts of the world, so that we begin operating more and more at the margin of the capability of the land. Migrations of populations are no longer possible in the way that they were in the past because of national boundaries. Now we have to anticipate what we have to do. Now slight variations in climate may have a large effect on world population.

I think that is one problem we can anticipate and should at least have in the back of our mind as we approach this next Conference.

Clearly, if nothing else, the energy question should have told us that there are going to be other strategic resources in short demand in the future. The OPEC of copper or the OPEC of manganese or the OPEC of what have you will be of a different structure, but can well arrive in the future. With the experience we have had in this decade we ought to try to figure out ways in which that kind of cartel organization is not developed, that there is no incentive for it to develop and the best way to do that is to have clear independent and economic interests that haven't been developed.

Senator STEVENSON. Thank you, gentlemen, for your helpful and thoughtful statements.

The subcommittee is recessed until 2 o'clock.

## AFTERNOON SESSION

Senator STEVENSON. The subcommittee will come to order.

Our next witnesses, comprising a panel, are Paxton Dunn, chief economist of the U.S. Council of the International Chamber of Commerce; Harvey Wallender, vice president of the Council of the Americas; Marcus B. Finnegan, senior partner of Finnegan, Henderson, Farabow & Garrett of the District of Columbia; and Benjamin Sharmman, international affairs representative of the International Association of Machinists and Aerospace Workers.

**STATEMENTS OF PAXTON DUNN, CHIEF ECONOMIST, U.S. COUNCIL OF THE INTERNATIONAL CHAMBER OF COMMERCE; HARVEY WALLENDER, VICE PRESIDENT, COUNCIL OF THE AMERICAS; MARCUS B. FINNEGAN, SENIOR PARTNER, FINNEGAN, HENDERSON, FARABOW & GARRETT; AND BENJAMIN SHARMAN, INTERNATIONAL AFFAIRS REPRESENTATIVE, INTERNATIONAL ASSOCIATION OF MACHINISTS**

Senator STEVENSON. Gentlemen, we are going to be interrupted from time to time this afternoon, I'm afraid, by rollcall votes, and we have another panel testifying, so we are not going to have a great deal of time. I will, therefore, ask you, if at all possible, to make your statements short, to condense them if you can, in which case I will place the full statements in the record in order to leave plenty of time for questioning.

Mr. Dunn, can we start with you first?

Mr. DUNN. Mr. Chairman, I believe Mr. Wallender and I are in joint testimony and we agreed among ourselves Mr. Wallender would start off.

Senator STEVENSON. One statement for two. That's fine.

Mr. Wallender.

Mr. WALLENDER. Mr. Chairman, we find at this time, especially within the U.S. industry, that we are being pressed very strongly by the developed countries, and a variety of international forums, to develop some type of new policies and programs in response to this question of international transfer of technology. All right, we find ourselves facing in a number of countries new legislation, new programs, that have significantly hindered U.S. industry and U.S. private sector in carrying out its role in foreign commerce and investment.

The United Nations Conference in 1969, and particularly its preliminary work programs, allow an important opportunity for the U.S. private sector to change some prevailing dangerous and unstable concepts regarding the international transfer and development of technology.

Hopefully, this allows a chance to dialog with some of the concerned parties here in the United States which are also concerned with the overall impact of transfer of technology. We find ourselves today primarily faced with demand from the Third World that, one, we reduce the cost of the Third World of importing our technology.

Second, they are anxious to gain greater control over the technology transfer and applications and also that they are anxious to reduce the

proprietary characteristics of special industrial technology in order to increase greater local diffusion. They are anxious to involve their governments more directly in bargaining for our technology, and to assure that it's transferred in a more appropriate fashion.

At the same time, our companies are being pressed in the United States and developed countries to assure that we are not in fact inadvertently exporting unique capability or jobs, or other advantages which are important to U.S. companies and other developed countries' companies.

More specially, at this time, though, these kind of discussions have led to a rash of specific restrictive legislation in a wide variety of countries, especially Brazil, Nigeria, Turkey, Mexico, and the Andean Common Market.

Unfortunately, the new laws and programs have been developed without a full understanding of the practical factors that affect the transfer and development of technology. Many U.S. firms believe the activities in the developing world are creating a number of undesirable impacts on the industry. A reduction in our overall exchange of technology and, therefore, trade. Reduction of U.S. corporations participating in foreign investment or sale of technology. A reduction in the competitiveness of U.S. business due to inappropriate diffusion of the technology they now legally control, and, finally, an overall decrease in the presence of U.S. industry and, therefore, U.S. influence in the developing world.

Obviously, these situations vary dramatically from different industries, companies and environments. It's not in the interest of the international business community nor the Third World to encourage these kind of results. The U.S. Government's approach to the U.N. Conference to date provides us with a very special type of opportunity for practical and pragmatic discussions and a good chance of reducing the conflict and misunderstanding prevailing in the international environment.

It seems to us, then, that the goals of a U.N. Conference, as they are emerging today should be first of all to allow us to develop a practical understanding between the private and public sectors regarding the international process of technology and development transfer. We are also concerned about the identification of workable programs that can aid the Third World in creating its own appropriate scientific and technological infrastructure.

It's our belief that if in fact we can help build usable infrastructures we might increase the overall demand for technology and our products and therefore not in fact limit U.S. export of technology and its products, but rather increase it. We feel we have a chance through the Conference to clarify the realistic capabilities for change of the international supplier. We also believe that we can establish new procedures by which private and public officials, from both the developed and developing countries, can work together in a cooperative fashion for policy and program development.

Unfortunately, in the past these programs have been developed from a loose, theoretical standpoint and not including the participation of technicians and specialists who understand the practical limitations of the technology process.

Also, we have hoped that this kind of discussion on technology can be broken down in the sense that people have to realize that science and

technology programs must vary dramatically from country to country, industry to industry.

We also would hope that the goals of the Conference would lead to an appreciation of the ability to receive and exploit technology is a more fruitful area of concern for the Third World than demanding obligations from and unilateral change by suppliers.

In this environment, where expectations of the Third World have risen too dramatically and hopes are high, we feel it's important that we come up with practical solutions and programs.

Senator STEVENSON. Let me interrupt for a second. There are a number of people standing in the back of the room, and there are empty seats in the front of the room. Those seats are reserved for witnesses, but we don't need them. So, if you would like to use those seats, feel free to do so.

Mr. WALLENDER. The ability of the developed nations, especially the United States, to assist this Third World development of science and technology is actually quite limited, unless we can work with the Third World to help them understand that we can't improve our ability to supply technology unless they can at the same time improve their ability to receive and exploit the technology.

The private sector, especially U.S. business is a source of innovation, it is a source of all types of problem solving systems and it has highly trained manpower. We feel that this kind of conference, in looking at practical programs will provide us with ways of learning how to make these resources available to the Third World without damaging U.S. interests.

The preparations for the U.N. Conference, unlike the past, in which the private sectors has not always been allowed to contribute to inter-governmental meetings, the U.S. Government presently has approached the private sector for a wide variety of cooperation and participation.

Ambassador Wilkowski, U.S. Coordinator for the Conference, has encouraged business and other private sector groups to suggest programs and innovations. Her office has provided early support to U.S. business so that it can gather descriptive and analytical materials as well as final suggestions for policy options.

Because of the leadership and openness evidenced by the U.S. Government in its preparation and also because of our belief that business must find new ways to dialog with the Third World on this important issue, four organizations have formed a consortia to bring together as wide a variety of information and ideas as possible. This work has already begun in early September.

The program allows over 200 companies and a wide variety of universities to participate in examining specific programs and policies and trying to evolve an identification of just how this system can be changed to the benefit of the Third World and to the benefit of the United States.

Our program, and we believe the interim work, of the conference, will provide us with an opportunity not just to take positions but to provide a wide variety of working materials, that will be useful to the Third World, and will be useful to us in a wide variety of other international forums.

Most specifically, we believe we must begin an extensive education program about the actuality of technology transfer and development. If we don't do that, we will be left in a continuing conflict situation which has already damaged U.S. business presence abroad. It has damaged our balance-of-payments situation and it also leaves us in a situation where we cannot provide useful support for the Third World. Thank you.

[The statement follows:]

STATEMENT OF PAXTON T. DUNN OF THE UNITED STATES COUNCIL OF THE INTERNATIONAL CHAMBER OF COMMERCE AND HARVEY W. WALLENDER III OF THE COUNCIL OF THE AMERICAS

UNITED STATES PRIVATE SECTOR AND PREPARATIONS FOR THE UNITED NATIONS CONFERENCE ON SCIENCE, TECHNOLOGY, AND DEVELOPMENT

The governments and private sectors of the United States and other developed countries are being pressed in various international forums to develop innovative new policies and programs on the international transfer of technology. The exchanges in these debates have already generated a variety of new foreign legislation and institutional programs which have hindered the U.S. Private Sector to carry out its role in foreign commerce and investment. The United Nations Conference in 1979, and particularly its preliminary work programs, allow an important opportunity for the U.S. Private Sector to change some prevailing dangerous and unstable concepts regarding the international transfer and development of technology.

Theoreticians and political bodies in the third world are greatly concerned with the developing world's inability to develop its own scientific and technological capabilities. This concern has led to the conclusion that the existing economic order should be modified to accomplish a number of goals:

1. To reduce the cost to the third world of importing technology;
2. To gain greater local control over foreign technology and its applications;
3. To reduce the proprietary characteristics of industrial property in order to increase greater local diffusion; and
4. To involve local governments more directly in bargaining for technology so as to ensure more appropriate transfers and reduce foreign dependency.

The appeal of these goals has led to a rash of specific restrictive legislation in a wide variety of countries and regional groups, including Brazil, Nigeria, Turkey, Mexico, the Andean Common Market, etc. Unfortunately, these new laws and programs have been developed without a full understanding of the practical factors that affect the transfer and development of technology. Many U.S. firms believe that the activities of the developing world are creating a number of undesirable impacts such as the following:

1. An overall reduction in the global exchange of scientific and technological knowledge.
2. A reduction in the ability of U.S. corporations to participate effectively in development through direct foreign investment or the sale of technology.
3. A reduction in the competitive position of U.S. business due to inappropriately diffused proprietary knowledge.
4. A decrease in the presence of U.S. industry and therefore U.S. influence in the developing world.

All of these vary dramatically in different industries, companies, and developing country environments. It is not in the interest of the international business community nor the third world to encourage these results. The U.S. Government's approach to the U.N. Conference provides a unique opportunity for practical and pragmatic discussions to reduce the conflict and misunderstanding prevailing in the international environment.

GOALS OF THE U.N. CONFERENCE

Previous intergovernmental debates on science and technology have failed to sufficiently include practical and knowledgeable experts. The U.S. Government's preparation for this conference could help remedy this situation and move discussions at both the national and international level toward a multi-disciplinary exchange supporting a number of specific goals:

1. Development of practical understanding between the private and public sectors of the existing international process of technology development and transfer.

2. Identification of workable programs that can aid the third world in creating its own appropriate scientific and technological infrastructure.

3. Clarification of the realistic capabilities for change of the international suppliers of technology.

4. Establishment of new procedures through which private and public officials, from both the developed and developing countries, can work together in a cooperative fashion for policy and program development.

5. Realization that science and technology programs must vary dramatically from country to country, industry to industry, and sector to sector.

6. Appreciation that the ability to receive and exploit technology is a more fruitful area of concern for the third world than demanding obligations from and unilateral change by suppliers.

7. Examination of the actual forces which effect change of both the supplier and receiver of science and technology.

Expectations of the third world have risen dramatically and hopes are high that somehow new scientific and technological governmental agreements can solve development problems especially if suppliers could be made to drastically modify their behavior. In fact, the ability of the developed nations to assist the third world in the development of science and technology is extremely limited unless the third world accepts responsibility for modifying their own environment so that they can effectively receive and exploit the science and technology that could be provided. The Private Sector and established U.S. business is a vital source of innovation, problem solution, and highly trained manpower which could aid a variety of specific programs. However, it cannot participate effectively if it is excluded from program development or forced into impractical and mutually unproductive activities.

#### PREPARATIONS FOR THE U.N. CONFERENCE

Unlike the past, in which the private sector has not always been allowed to contribute to intergovernmental meetings, the U.S. Government has approached the Private Sector for its cooperation and participation as opposed to being asked to merely veto policy conclusions. Ambassador Wilkowski, the U.S. Coordinator for the conference, has encouraged business and other Private Sector groups to suggest programs and innovations. Her office has provided early support to U.S. business so that it can gather descriptive and analytical materials as well as final suggestions for policy options.

Because of the leadership and openness evidenced by the U.S. Government in its preparation and also because of our belief that business *must find new ways to dialogue* with the third world on this important issue, four organizations have formed a consortium to bring together as wide a variety of information and ideas as possible. The Fund for Multinational Management Education, the Council of the Americas, the U.S. Council of the International Chamber of Commerce, and the Graduate Program in Science, Technology, and Public Policy of the George Washington University have already begun a program involving over 250 U.S. corporations, a number of academic and specific consultants, and a wide variety of government experts. Twenty-four small workshops have already been held throughout the United States to develop descriptive and analytical materials which would serve the following objectives:

1. To identify pragmatic ideas in response to demands for a new international economic order while preserving the essential values of U.S. private and public technology processes.

2. To actively involve the U.S. private sector in the technology transfer dialogue on an ongoing basis in a work environment with which it is familiar, and to involve industry leaders in the public policy debate.

3. To aid the U.S. Government's policy development process regarding the transfer of technology by identifying and analyzing U.S. business and industry concepts, innovations, and constraints.

The conclusion of this work is not designed to present consensus positions but rather to create a wide variety of ideas, background information, and discussion that support the critical education process inherent in the U.N. Conference opportunity. The business community is excited about this new opportunity to collaborate with the U.S. Government in the essential dialogue process that will

take place in the next two years prior to the Conference. This process offers the possibility of clarifying misconceptions about science and technology. It is hoped that it will also establish new vehicles for private and public cooperation as opposed to the conflict and negative consequences which have often surrounded intergovernmental working programs in this area in the past.

Senator STEVENSON. Thank you, Mr. Finnegan?

Mr. FINNEGAN. Senator Stevenson, I am speaking on behalf of the U.S. Chamber of Commerce. This is a national organization comprised of 3,700 local, State, and regional chambers, and trade and professional organizations, together with over 69,000 business firms throughout the United States.

Of special relevance to these hearings here today is the fact that the chamber also includes American chambers abroad in 41 different countries.

The subcommittee is to be commended for its concern with the U.S. policy on transfer of technology to the developing countries. Congressional interest is essential if this issue is to receive the national recognition which it deserves.

In the invitation to speak before this subcommittee, two questions were posed. One concerned preparation for the U.S. position in the 1979 United Nations Conference on Science and Technology for Development.

The second question requested the views of the U.S. Chamber on the role of the private sector in helping to achieve technology transfer to the developing countries. Our answers to both questions are set out in a white paper of April 1977 on "Technology Transfer to the Developing Countries." It was prepared by the chamber's Task Force on Technology Transfer.

Because this white paper is addressed so specifically to the objectives of these hearings, I request that its executive summary be placed in the record. This report articulates some basic perceptions that emerged with regard to the role of the private sector in successful technology transfer to the developing country when the chamber first sought to determine its position on this question.

Rather than summarizing the paper, I think it would be better to express the thinking that went into the paper. A technology transfer workshop was formed in June 1975—2½ years ago—to examine the implications for American business with regard to the seemingly increasing tendency of foreign governments in the developing world to impose new forms of control over inflows of technology.

Representatives from over 70 corporations and trade associations participated in this workshop. The chamber broadly defined the term technology for the workshop's consideration as encompassing patents, trademarks, and copyrights—the traditional vehicles—but also, and perhaps more importantly, know-how, including trade secrets, management services, technical assistance, and combinations of these various forms of intellectual and industrial property.

Broadly, technology and special know-how can be defined as everything except capital and labor that is needed to set up and run a going business.

Two aspects of the chamber's concern were explored. One was—through case-by-case experiences of many of the corporations who are represented in the workshop—the problems created by foreign governments' requirements regulating the transfer of proprietary tech-

nology in terms that would be economically acceptable to the owners of the technology.

Sometimes the requirements of the foreign governments were so severe and self-defeating that no transfer actually took place in instances where, initially, the owners of the technology, in fact, wished to transfer it.

Some of the members of the workshop expressed frustration about the national technology policies of the developing countries. They felt these policies were self-defeating in many instances and thus tended to discourage rather than encourage technology transfer activity.

The second aspect of the chamber's concern was the emergence of proposals particularly from international organizations such as branches of the United Nations, to create a legally binding, multi-lateral code of conduct regulating the transfer of technology to the developing countries.

The initial code came out of a conference in April 1974 in Geneva, Switzerland. It was not actually sponsored by the United Nations, but it took place under United Nations auspices. Subsequently, the United Nations Conference on Trade and Development, known as UNCTAD, and also based in Geneva, has taken up the cry to develop a code of conduct regulating technology transfer to the developing countries.

The positions espoused by the developing countries, who in U.N. parlance are often called the Group of 77, were imbued with the rhetoric of the New International Economic Order. They claimed the right to special economic treatment from the richer countries. Part of their philosophy seems to be to get a larger slice of an existing pie, rather than to seek to make the overall pie larger.

Some of the tenets adopted by the Group of 77 can be traced back to what Senator Moynihan, when he was U.S. Ambassador to the United Nations, called the "British Revolution"—a revolution based on the tenets of Fabian socialism. Many of the developing countries seem to have adopted these tenets and philosophy.

One tenet is government ownership of many of the means of production. The second important tenet is redistribution of existing wealth rather than creation of additional wealth. A third tenet is that this redistribution is to take place as reparations for past exploitation of the poor by the rich.

The most acceptable of these tenets, however, is the fourth one which says all of these objectives are to be accomplished via parliamentary votes rather than violent revolutions. So the developing countries seek technology transfer terms more favorable to the receivers than would normally be the case if the terms were set by market forces.

They reject the mechanism of allocation of resources, profits, and economic benefits through open market forces, which of course, is the cornerstone of U.S. antitrust policy—free and open competition.

In the Workshop discussions, four key points emerged. First, there is a trend in the developing countries toward more restrictive conditions on payments for proprietary technology and the terms under which it will be used by the receivers of the technology.

Second, in their approach to technology transfer policy, international organizations and the developing countries labor under an economic misconception; namely, that the owners of technology can be



induced or compelled to transfer their technology to the developing countries under terms that are neither favorable to nor consistent with the objectives of the owners and their overall business purposes.

Third, that this misconception could have the unintended and counterproductive effects of diminishing the flow of technology, to the detriment of the developing countries, and of preventing a fair economic return to the owners of the technology.

Fourth, the concerns of U.S. business with the consequences of this misconception should be communicated to representatives of the developing countries and to the international organizations, particularly the United Nations.

To translate its consensus to action, the Chamber established a Task Force on Technology Transfer in May 1975. Its membership included individuals with wide business and government experience in technology transfer activities. One of its first acts was to draft a statement setting forth views developed out of the Workshop for guidance of the U.S. delegation to the UNCTAD IV Conference in Nairobi, Kenya, which took place in May and June of 1976.

This statement is quoted in the formal statement of my testimony in full, and I will just summarize part of it here.

The chamber declared that it was sympathetic to the need for effective transfer of technology to the developing countries. It declared it was committed to do its part on behalf of the U.S. business community to promote transfer of appropriate technology on a mutually satisfactory and reasonable basis. It declared it was disposed to cooperate with U.S. agencies in drafting appropriate guidelines for growth of technology transfer to the developing countries under mutually beneficial terms and conditions.

It stated that the Group of 77 would impede and not encourage technology transfer by raising serious questions of legality, ethics, and equity. And the chamber called upon the responsible governments to revise these positions, keeping in mind the following six points:

First, ownership of technology is acquired for value paid or it is developed under costly and uncertain conditions, usually entailing research and development programs which often pursue 100 blind alleys to hit one good development that ends in profits for the company. Technology is a form of property. When it is shared, it is entitled to adequate protection.

The second key point was that normally the sharing of technology takes place through voluntary agreement. It is an elective exercise.

The third point is that the sharing of the technology would be within a framework that recognizes and protects the rights of owners to fair payment and protection against unauthorized use.

Fourth, the price and value of technology should be determined by its usefulness in the marketplace, not by prejudged or predetermined ideas of its cost or its incremental value to the supplier.

Often, developing countries have said to the industrialized countries, "Why don't you give us this technology? You already own it. You have already performed the research and development to produce it. It exists, and you have used it in your own country. Why don't you just turn it over to us without any consideration or cost to us whatsoever?"

Such reasoning is again evidence of a misconception. It is like the

man who is the last passenger on an airplane. The airplane is scheduled to go. There is one seat left, therefore, the man claims they should let him get on the plane and ride for the cost of his lunch.

In fact, however, technology is a commodity just like any other commodity—just like tin, or bauxite, or wheat, or oil—the commodity we hear so much about these days. It has a value and a price that can be placed on it.

The fifth point is that the suppliers of technology are normally willing to accept responsibility for the effective use of that technology when it goes on-stream or comes in place in the developing country, but they are willing to do this only to the extent that they can exercise some control over the use of the technology in the receiving country.

And, the sixth key point is that the development of an international body for arbitration of disputes concerning contract agreements might lead to a more stable transfer environment.

We feel that these contentions in the six-point statement of the U.S. Chamber also apply to the official U.S. position which we believe should be adopted at the 1979 U.N. Conference.

I would like to just condense my remarks and say a few more things. One thing that the chamber believes is important to do is to apply recognition of the importance of technology transfer to the U.S. economy as a complement to international trade and international investment. We believe a lack of awareness of the importance of international technology transfer to the U.S. economy has occurred because of the way in which the international balance of payments accounts are normally presented.

For example, in 1976, the U.S. exports were approximately \$115 billion and the imports were approximately \$120 billion. These enormous amounts tend to dominate and overwhelm our perception of how we are performing in world markets. Payments for technology that came back to the United States showed a net return to the United States of almost \$4 billion.

These payments were basically for royalties and fees charged for the use of technology transferred overseas. Now, this \$4 billion may look small compared to the trade figures, but the point that is often missed is that that \$4 billion is a net return. It goes right to the bottom of the balance sheet. The same net return if achieved from trade would require an export performance of approximately \$85 billion.

Perhaps you can grasp the significance of technology transfer to our economy by an analogy to professional football. The quarterbacks and receivers attract the most recognition and spend the most time on offense, but it is the special teams that put between 35 and 45 percent of the points on the board. The bottom line again.

In the U.S. balance of payments, a similar proportion of net earnings—the bottom line—derives from technology transfer activities.

Another point is that less than 20 percent of technology transferred from the United States is now going to the developing countries, but that proportion is growing. The productivity of the developing countries is increasing relative to the industrialized countries.

And we have found that the more technologically advanced a country becomes, the more exports it is able to make; the more imports it is able to receive; the more trade it engages in and the greater contribution it makes to overall global wealth.

Nobody particularly wants to trade with a country that is merely at the subsistence level. In fact, such countries generally have nothing to trade, except perhaps raw materials. Trade has been called, "the engine of economic growth." Trade stimulates economic performance, and it is important to place technology transfer in its true economic perspective. It is an indispensable part of the positive factors that provide expansion, not reduction, in world economic activity.

Mr. Sharman will testify, I am sure about the position of organized labor with respect to technology transfer. Organized labor is concerned. It feels that technology transfer may mean the transfer of jobs overseas as well as technology.

The response to this is: first, the facts do not support this fear as a general rule, although certainly you could find specific examples that undoubtedly exist.

Second, you cannot really bury or bottle up technology in peacetime. Its diffusion cannot be long controlled. Look at the atomic bomb technology. We tried to control that every possible way we could, and yet it escaped and got to Russia, even under a wartime framework of strict national security regulations.

Therefore, any attempt to place real restraints on the export of technology from the United States would simply in the end be countered by more technology transfer from other industrialized countries who are now worldwide competitors, such as Japan and Western Europe. In the long run, we believe attempts to impose restraints would lead to a greater loss of jobs for American workers.

When we sent out the white paper, we distributed copies to over 500 major business corporations in the United States and received over 60 responses from these corporations. They, in basic principle, agreed with the points in the white paper.

I would like to close by quoting one of the statements that came from one of the letters. Quote:

As we see it, in a free enterprise economy, industry develops technology to yield profitable growth for its stockholders' capital. Any governmental policies, be they those of the U.S. Government or those of developing countries that recognize and build on this fact will be successful. Policies that are counter to the profit motive will, in our judgment, be generally unsuccessful in enlisting industry in technology transfer to the developing countries.

I think that pretty well sums it up. In the United States—in the free world in general—almost all of the valuable and useful technology is in the private sector. It is owned by private parties. Under our system of government—and developing countries do not seem to often understand this—even the Government cannot just order the owners technology to automatically transfer it to the developing countries. There has to be an economic incentive to transfer it.

The men who manage the corporations are responsible to the shareholders who are the ultimate owners, and if these managers don't get adequate returns on the investments they decide to make with the company resources, the company will fail and drop out under our free enterprise system. So there is a lot of pressure on them to recognize this fact of life.

Finally, I have an article here published in the Inaugural Issue of the *Hastings International and Comparative Law Review* entitled "A Code of Conduct Regulating International Technology Transfer: Panacea or Pitfall?"

If the subcommittee so chooses, I would like to make this article a part of the record. I have already given copies to some of the staff. Senator STEVENSON. That will be entered in the record.  
[The statement and material referred to follows:]

#### STATEMENT OF MARCUS B. FINNEGAN

My name is Marcus B. Finnegan, partner in the law firm of Finnegan, Henderson, Farabow and Garrett, Washington, D.C. I am appearing on behalf of the Chamber of Commerce of the United States in my capacity as a member of the Chamber's Task Force on Technology Transfer.

#### INTRODUCTION

The National Chamber's membership is composed of more than 3,700 local, state and regional chambers of commerce and trade and professional organizations, together with over 68,000 business firms. Of special relevance to the subject of these hearings, the Chamber's membership also includes American chambers of commerce abroad in 41 countries.

The subcommittee is to be commended for its concern with U.S. policy on technology transfer to the developing countries. Congressional interest is essential if this issue is to receive the national recognition that it deserves.

In the invitation to appear before the Subcommittee, two questions were posed. One concerns the preparation of the U.S. position on the 1979 United Nations Conference on Science and Technology for Development. The other requested our views on the role of the private sector in achieving transfer of technology to developing countries.

#### BACKGROUND OF CHAMBER REPORT "TECHNOLOGY TRANSFER AND THE DEVELOPING COUNTRIES"

Our answers to both questions are set out in a report published by the Chamber in April 1977. "Technology Transfer and the Developing Countries."<sup>1</sup> Because the report is addressed so specifically to the objectives of these hearings, I would like to request that its Executive Summary be placed in the record.

The report is an articulation of some basic perceptions that emerged spontaneously with regard to the role of the private sector in the successful transfer of technology to the developing countries when the Chamber first attempted to determine its position on this problem. Therefore, rather than summarizing for the Subcommittee the contents of the report, it may be more helpful to describe the events and thinking that went into its preparation.

The Chamber's initial move was to organize a workshop in June 1975 to examine the implications for American business of what seemed to be an increasing tendency of foreign governments, particularly in the developing world to impose new forms of control over inflows of technology. Representatives from over 70 corporations and trade associations participated. By technology, the Chamber meant all types of intellectual and industrial property, including patents, trademarks, copyrights, "know-how", trade secrets, franchises, management services, technical assistance, and various combinations of these forms of property.

There were two prominent aspects to the Chamber's concern that were explored at the workshop. One derived from the specific experiences of companies on a case by case basis. At issue here were problems encountered in meeting foreign government requirements governing the transfer of proprietary technology on terms that were economically satisfactory to the owners of the technology. Sometimes these constituted "horror stories" in which proposed transfers simply did not take place. In general, the experiences related at the workshop described a widespread feeling of frustration on behalf of many companies that the national technology policies of some countries were self-defeating and were having the effect, if not the intent, of discouraging technology transfer activity.

A second aspect of the developments examined at the workshop was the emergence of proposals within international organizations for legally binding multilateral codes regulating the transfer of technology to developing coun-

<sup>1</sup> "Technology Transfer and the Developing Countries." Chamber of Commerce of the United States, April 1977.

economy becomes, the most it can produce for export and, as a consequence, can afford to import and thereby contribute to global wealth. Current parlance accurately refers to trade as the "engine of economic growth," meaning that trade is a basic stimulant to economic performance. It also follows that the higher the economic performance, the greater the volume of trade. This is certainly the lesson of economic history. It is important, therefore, to place technology transfer in its true economic perspective. It is an indispensable part of the positive factors that cause expansion, not reduction, of total world economic activity.

However, concern has been expressed, particularly by organized labor in the United States, that the transfer of technology abroad means the transfer of jobs as well. In response, it can be stated: (i) that the facts do not support this as a general rule, though individual examples doubtless exist; (ii) that technology cannot be buried or bottled up, and in peacetime its diffusion cannot for long be controlled. Restraints on exports of technology in the United States would simply be countered by more technology transfer from other industrial countries, leading in the long run to a greater loss in jobs for American workers. As with other areas of economic exchange—trade and investment, for example—the policy should not be to place a wall around the country but in sponsoring, where necessary, retraining, adjustment assistance, and above all, continued research and development to keep the American worker the most productive in the world.

2. For purposes of this mission, we include the exchange of all types of intellectual and industrial property, including patents trademarks, copyrights, know-how, trade secrets, franchises, management services and technical assistance.

It should be added that we are referring to *proprietary* technology—that which is owned by private business enterprises. We recognize that considerable technology resources of interest to developing countries have been developed and are owned by governments. For practical purposes, however, the evidence indicates that the bulk of the valuable and useful technology most relevant to developing countries' needs will continue, as it has in the past, to originate in the private sector. Nevertheless, the dialogue on technology transfer underway in international organizations often appears to reflect an assumption that the policy decisions are made on a government to government basis. The point has to be emphasized that insofar as proprietary technology is concerned, any decisions by the governments of developing countries must take into consideration the interests of the private parties that own the technology. These technology owners will not agree to terms and conditions they judge, in the long term, to be unacceptable. As expressed in the report's Executive Summary, "technology transfer not only should not, but it cannot, be compelled."

3. We would offer our assistance in mobilizing the resources of the U.S. business community, in formulating U.S. government positions for use in current negotiations in international bodies concerning the transfer of technology.

This objective relates directly to the Subcommittee's concern with the adequacy of private sector involvement in the preparation of the official U.S. position at the coming United Nations Conference. In general, the government should be commended for its active efforts in this area. U.S. participation in the broad range of international bodies concerned with aspects of technology transfer policy is characterized by a high degree of cooperation with the private sector. The same cooperative spirit is evident in preparations for the United Nations Conference. We have worked closely with government officials in developing the specifics of our report and have shared the finished report widely in all parts of the government concerned with technology transfer policy.

4. We would seek to develop specialized constituencies and continuing contacts among the government and business community in the United States and other industrialized countries and—equally important—in government and business communities in the developing countries.

Our technique here has been to distribute the report as widely as possible among business and government people in this country and overseas. For example, copies of the report and an executive summary have been mailed to the chief executive officers of almost 500 of the largest U.S. corporations, requesting their comments on the report's findings. Over 60 detailed responses, overwhelmingly in support of the report's general thesis, have been received. Copies of the replies were shared with the appropriate government officials.

For a grassroots reading, the Chamber organized a series of regional workshops for discussion of the issues presented in the report with representatives of small to medium international firms, in different parts of the country. So far,

workshops have been held in Chicago and Atlanta; and others are scheduled in New York, Los Angeles, and Houston.

As for results, the Chicago and Atlanta workshops revealed clearly that concern with the technology transfer policies of developing countries is not the concern solely of the larger, multinational corporations. We understand that the government's preparation for the United Nations Conference will include some similar form of regional meetings.

In cooperation with the American Chambers of Commerce abroad, meetings will be scheduled overseas with representatives of foreign business and government organizations. The possibility of such a meeting in Mexico early next year is under active consideration.

In identifying those constituencies that have a stake in allowing market forces to determine the level of business activity associated with technology transfer, a special effort has been made to include organized American labor. Some of its concerns with the employment effects of technology transfer have been responded to above.

5. All of the above activity would be designed to improve the worldwide environment within which the transfer of technology can operate, secure in the knowledge of what the ground rules are, how disputes may be resolved, and how basic economic activity may be protected and rewarded.

As discussed above, the report defines technology transfer and analyzes the problems apparent in developing a policy with respect to developing countries. It determines the importance of a concentrated effort by U.S. government and business in addressing the issues raised in UNCTAD in a positive manner. The report also makes some specific suggestions for consideration by the U.S. and foreign governments, by international organizations and by the business communities in the United States and abroad.

In conclusion, I will summarize the general response to these suggestions in our discussions with business and government. There was no significant disagreement with the suggestion for a concerted education campaign concerning the potentials of technology transfer for economic development, and the dangers if incentives to such transfer are replaced by disincentives. Similarly, in our discussions with business groups, we received strong backing for a strong U.S. line against the disruption or unilateral abrogation of technology transfer arrangements. In this respect, the possibility of withdrawing duty free treatment under the Generalized System of Preferences on products made in violation of the terms of such arrangements drew general support.

Rejected proposals included any new government structures to arbitrate technology transfer problems or government programs to facilitate or otherwise encourage transfer activities. In turn, it was agreed that existing U.S. government and international organization programs and mechanisms are adequate to promote a positive legal environment in which transfers can take place.

As indications of business views on the role of government in the technology transfer process, we have shared with the Subcommittee staff comments on the Task Force report which we have received from corporations. A direct quote from one such letter will summarize the general tone respecting proprietary technology:

"As we see it, in a free-enterprise economy industry develops technology to yield profitable growth for its stockholders' capital. Any governmental policies, be they those of the U.S. government or those of developing countries, that recognize and build on this fact will be successful. Policies that are counter to the profit motive will, in our judgment, be generally unsuccessful in enlisting the effective participation of industry in technology transfer to the developing countries."

# H A S T I N G S

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# A Code of Conduct Regulating International Technology Transfer: Panacea or Pitfall?

By MARCUS B. FINNEGAN

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## I. INTRODUCTION

**M**OST OF THE valuable, useful, and transferable technology in the world lies in the hands of the industrialized or developed countries.<sup>1</sup> These developed countries form two major political-economic groups. In the terminology of the United Nations, these two groups are (1) the developed market-economy countries, or the so-called Group B countries, and (2) the socialist countries, or the so-called Group D countries. In the Group D countries, technology, as a form of property, is owned by the governments of those countries. The Group B countries, however, possess the major share of the world's valuable technology, and almost all of this technology is owned by private companies, not by the governments of these countries.<sup>2</sup> There is some government-owned technology in the Group B countries, but virtually all of this technology is untried, unproven, and unused. It tends to

1. See J. DE CUBAS, *Technology Transfer and the Developing Nations*, FUND FOR MULTINATIONAL MANAGEMENT EDUCATION & COUNCIL OF THE AMERICAS 6-7 (1974), *The Possibility and Feasibility of An International Code of Conduct on the Transfer of Technology*, U.N. Doc. TD/B/AC.11/22 at 5-6 (1974); S. Patel, *Transfer of Technology and Developing Countries*, 6 FOREIGN TRADE REVIEW at 387-90 (Jun-Mar. 1972).

2. See note 1 *supra*. See also, *Survey of Corporate Research & Development Spending - 1975*, BUSINESS WEEK, June 28, 1976 at 62, McMullen & Carroll, *New Research Findings - The Lag in U.S. Research and Development*, 1 NEW INTERNATIONAL REALITIES 18 (Apr. 1976), Remarks of D. L. Guertin (Panel Discussion), 1976 PROCEEDINGS OF THE AM. SOC. OF INT'L L. at 237.

constitute the fruits of basic research or research which has not yet reached the stage of practical application which is characteristic of applied research. In the Group B countries, the private companies that own the practical technology must operate at a profit for their shareholders on a long term basis. If these companies do not generate a profit, they will eventually go bankrupt. Accordingly, a basic premise in the management of private companies is that the company must look forward to an acceptable return on investment (ROI). If management cannot foresee an acceptable ROI from the projects that are proposed to it, management will instead devote the company's energy and resources to projects for which the ROI is more promising.<sup>3</sup>

A basic difficulty or misunderstanding that has arisen between the transnational enterprises ("transnationals") and the developing countries seems to stem from a failure on each side to understand the basic premises underlying the philosophic and economic principles under which the other side operates. The developing, or "Group of 77,"<sup>4</sup> countries are naturally desirous of obtaining technology from the industrialized (Group B and Group D) countries under the most favorable possible circumstances. It is implicit that the primary mechanism for effecting the bulk of this transfer is through the discretionary activities of the transnationals.

One thesis that has been advanced is that once technology exists, it has already been paid for, and, therefore, it costs virtually nothing for the transnationals to transfer it to developing country enterprises.<sup>5</sup> The experience of the transnationals, however, is that useful, practical technology can be created only through the expenditure of tremendous funds for research and development (R&D). Most R&D programs now are incredibly expensive, and seldom rewarding, undertakings. For

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3. See W. Chudson & T. Wells, *The Acquisition of Technology from Multinational Corporations by Developing Countries*, U.N. Doc. ST/ESA/12 at 3-10 (1974); Department of Economic and Social Affairs of U.N. Secretariat, *Multinational Corporations in World Development*, U.N. Doc. ST/ECA/190 at 38-45 (1974). See also *The Breakdown of U.S. Innovation*, BUSINESS WEEK, Feb. 16, 1976 at 56-68.

4. In United Nations terminology, the developing countries, sometimes referred to as the "nonaligned countries," are denoted as the "Group of 77." It is believed this shorthand terminology for the developing countries, within United Nations circles, was first used in 1968 at a time when the total number of developing countries in the U.N. did, in fact, constitute 77 countries. At this time the number of United Nations member countries who are now included in the Group of 77 has risen to approximately 110 countries. This substantial augmentation in the short space of eight years reflects a rapid increase in the number of independent developing countries that has been taking place.

5. See J. DE CUBAS, *Technology Transfer and the Developing Nations*, FUND FOR MULTINATIONAL MANAGEMENT EDUCATION & COUNCIL OF THE AMERICAS 12 (1974).

every successful piece of technology generated from R&D a hundred other ideas are typically pursued which lead only to blind alleys.<sup>6</sup> Support of a successful R&D program thus requires not only a large initial investment of capital, but also demands that the profits from successful technology be plowed back into further R&D to generate successful new technology. It thus often appears that a high ROI is being obtained by a transnational on a successful piece of technology. But it is not clearly understood that a high ROI is needed to fund the R&D to support the creation of successful new technology because at the same time this ROI supports the hundreds of blind alleys which are also pursued, and for which the ROI is zero. Thus, royalties on successful technology are used to produce more successful technology and to support the research on other ideas that never bear fruit, but which may, nevertheless, require the investment of large sums before researchers can establish that the ideas will be still-born.

Another difference in viewpoint between the developed and developing countries is that the industrialized countries and the transnationals look upon successful technology as a commodity, whereas the developing countries apparently look upon successful technology as having a unique status that amounts to something other than, or more than, a commodity. Realistically viewed, however, successful technology is a commodity just like oil, coffee, wheat, tin, bauxite, or any of thousands of other commodities.<sup>7</sup> It has a value—and that value can be measured in terms of a price. The transnationals, operating under the profit incentive and depending in part on profits from technology sales to fund R&D programs, are thus extremely reluctant to sell successful technology at a price that represents less than its real value as a commodity. Accordingly, there is a conflict between the methods pursued by the transnationals for generating technology, which have been the most successful methods yet devised, and the ideas of the developing countries on what should be done to promote more efficient and less expensive transfer of technology. These are points of disagreement which must be resolved in a way that not only will not undermine and dry up the present technology transfer process, but that will make it even more efficient, productive, and helpful than it has been in the past.

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6. See K. SAUVANT & F. LAVIPOUR, *CONTROLLING MULTINATIONAL ENTERPRISES: PROBLEMS, STRATEGIES, COUNTER STRATEGIES* at 35-38 (1976) (reprint of Senate Finance Committee Report entitled "Implications of Multinational Firms for World Trade and Investment and for U.S. Trade and Labor")

7. *The Possibility and Feasibility of An International Code of Conduct on Transfer of Technology*, U.N. Doc. TD/B/AC.11/22, para. 17 at 5 (1974).

The achievement of this objective will require mutual respect between the developed countries and the developing countries for one another's problems. New initiatives must be explored for improving transfer. One of these initiatives is the Pugwash Code of Conduct on Transfer of Technology<sup>8</sup> submitted in the report of the Working Group at a Pugwash conference held in Geneva, Switzerland in April 1974, about which more will be said later. But a code of conduct must not be too rigid or inflexible, or it may have the reverse effect of what is intended.

The single most critical operative premise of any approach to the development of a code of conduct is that technology will be transferred only when both the owner of the technology is willing to transfer it and the transferee is willing to receive it. The starting point must, therefore, be an appreciation of those concerns and interests of the parties to a prospective transfer which are in conflict or competition, whether real or imagined. The dialogue in recent years between spokesmen for the views of the transnationals based in the developed or industrialized countries and spokesmen for the views of enterprises situated in the developing countries has contributed immeasurably to an understanding of the concerns and interests of these two important groups of transferors and transferees of technology."

Although the need for technology transfer into the developing countries has been recognized, incentives must exist for the owners of technology to engage and cooperate willingly in the transfer. The broadest policy objectives of a code of conduct should be conceived with an appreciation of the legitimate concerns of enterprises located in the developing countries, while preserving a climate in which transferors will willingly and enthusiastically continue to participate in the transfer process. This is especially true where any adopted code of conduct may serve as the basis for compulsory national legislation in a host developing country, rather than merely a format for guidelines to technology transfer.<sup>10</sup>

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8. U.N. Doc. TD/B/AC.11/L.12 (1974) [hereinafter cited as Pugwash Code].

9. This dialogue has taken place in various private, governmental and international forums. For a review of the various groups involved, see *The Possibility and Feasibility of An International Code of Conduct on Transfer of Technology*, U.N. Doc. TD/B/AC.11/22 at 27-30 (1974).

10. The experiences of the members of the Andean Group under its Common Regime of Treatment of Foreign Capital and of Trademarks, Patents, Licenses, and Royalties (Decision No. 24, adopted Dec. 31, 1970 by the Commission of the Cartagena Agreement, as amended), 11 I.L.M. 120 (1972), are instructive in this regard. Recent reports indicate that several members of the Andean Group believe the restrictions on foreign investment and technology transfer have damaged their economies beyond any tangible

The criticisms of the developing country enterprises with respect to technology transfer arrangements in the past have been voiced in various forums. The proposed Pugwash Code of Conduct resulting from the Geneva Pugwash Conference attempts to define clauses and practices which should be prohibited, and guarantees which should be made, to ensure equity in the transfer of technology to the developing countries. Similarly, the arguments of the transferors based in the developed and industrialized countries have been presented. These arguments stress the need for the absence of restraints to permit an environment in which technology transfer can flourish in an atmosphere of flexibility.<sup>11</sup> Both postures have merit, yet both must be compromised to reach an acceptable consensus. Owners of technology are moved to enter into agreements for its transfer more by the promise of a profitable ROI than by the opportunity to assist social improvement in the developing countries.<sup>12</sup> Transferees are motivated to allocate capital resources in consideration for technology by the need for such technology rather than by a desire to enhance the profit opportunities of technology owners.<sup>13</sup> Within this broad framework of differing objectives, the traditional pattern of contract negotiation in private enterprise economies can operate. In the end, agreement and cooperation will be achieved only if each party has realized its broad objective. The extent to which the objective of a party is satisfied depends upon its relative bargaining strength and flexibility.<sup>14</sup> Any form

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benefits that have been received from the common regime. Thus, several members are agitating for a relaxation of restraints on foreign investment and technology transfer. See *Reversal of Policy: Latin America Opens the Door to Foreign Investment Again*, BUSINESS WEEK, Aug. 9, 1976 at 34, The Wall Street Journal, Oct. 25, 1976 at 8, col. 1. Chile has in fact withdrawn from the Andean Group because of the severity of these restraints. The Wall Street Journal, Nov. 1, 1976 at 1, col. 3. See generally 3 INVESTING, LICENSING & TRADING CONDITIONS ABROAD — LATIN AMERICA § 1.05 et seq. (1976), *Review of Legislative and Administrative Systems for the Regulation of Technology Transfer Agreements*, U.N. Doc. ID/WG.208/2 at 17 (1975).

11. See, e.g., *Preparation of a Draft Outline of an International Code of Conduct on Transfer of Technology*, U.N. Doc. TD/B/C.8/AC.1/3 at 25-33 (1975) (U.S. Government comments on Pugwash Code); COUNCIL OF THE AMERICAS AND FUND FOR MULTINATIONAL MANAGEMENT EDUCATION, *Code of Conduct for the Transfer of Technology: A Critique* (1974) (analysis of Pugwash Code).

12. See M. Okano, *Practical Remarks Concerning the Selection of Technology Including Main Considerations of the Purchase of Intermediate Products, Components, etc.* in *Licensing Agreements*, U.N. Doc. ID/WG.178/4 at 5 (1974).

13. See *Interregional Consultation on Exchange of Experience between Developing Countries: Formulation and Application of the Mexican Law on Licensing and Patents and Comparable Experience in Other Developing Countries*, U.N. Doc. ID/WG.194/6 at 15-21 (1975).

14. See generally G. NIERENBERG, *The Art of Negotiating* (1968) especially chapters 2 & 11.

of external restraint on the ability of each party to reach its goal necessarily affects the relative bargaining postures of the parties. The desirability of such external restraints in the area of technology transfer, therefore, must be assessed by weighing the overall benefits to be gained by technology transfer against the impact of the restraints on the ability of the negotiating parties to arrive at an acceptable agreement to transfer technology.<sup>15</sup>

It is suggested that, as a general policy, any code of conduct for technology transfer should be drafted with a view towards three objectives: (1) preserving an environment in which technology transfer is potentially profitable for the transferor; (2) improving the bargaining strength of a developing country enterprise by defining reasonable external restraints to be placed on the transferor; and (3) retaining sufficient flexibility for both the transferor and transferee to permit negotiation in any given situation on an acceptable consensus which is tailored to the needs of that situation.

Notwithstanding the protests of some representatives of the viewpoint of the technology owners, technology transfer can be effected profitably in an atmosphere of external restraint. Transferors are accustomed, for example, to entering into technology transfer agreements within the constraints of the antitrust laws of the United States,<sup>16</sup> the European Economic Community<sup>17</sup> (EEC) and Japan.<sup>18</sup> Indeed, many of the objectives sought to be achieved by the developing country enterprises are the same as, or analogous to, those at which the antitrust laws are aimed. While the transnationals may disagree with particular prohibitions under those laws as interpreted, adaptation of licensing practices can and has been made.

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15. Otherwise, the diminution of technology flow resulting from such restraints may impact adversely on economic development. See note 10 *supra*. See also Green, *Emerging Restrictions on Transfer of Technology*, 15 IDEA 274, 275 (1971).

16. See SHERMAN ANTITRUST ACT, 15 U.S.C. § 1 *et seq.* (1973); CLAYTON ANTITRUST ACT, 15 U.S.C. § 12 *et seq.* (1973); FEDERAL TRADE COMMISSION ACT, 15 U.S.C. § 41 *et seq.* (1973). See also M. Finnegan, *The Effect of United States and EEC Antitrust Law on International Licensing and Licensing into Developing Countries*, U.N. Doc. ID/WG.131/4 (1972).

17. See Treaty Establishing the European Economic Community, March 25, 1957, 298 U.N.T.S. 11 (effective Jan. 1, 1958) (Arts. 85 & 86). See generally Finnegan, *The Burgeoning Development of the Common Market Competition Rules and Its Impact on International Licensing*, 27 MERCER L. REV. 519 (1976); Fine, *The Nature of A Restrictive Practice Under Articles 85 and 86 of the Treaty of Rome*, Part Two, 5 J. LAW & ECON. DEV. 201 (1971).

18. Antitrust impact on technology transfer agreements in Japan is provided by the Antimonopoly Act Guidelines for International Licensing Agreements promulgated by the Fair Trade Commission on May 24, 1968 and reprinted in H. IVORI ANTIMONOPOLY

The disincentive to engage in technology transfer which accompanies each restraint must be considered, however, and the aggregate effect weighed. If the balance is tipped heavily against the transferor, the beneficial effects of technology transfer may be subject to serious risk. A particular restraint may be advantageous, but of insufficient benefit to warrant jeopardy of technology transfer. In this context, the fact that the restraint is embodied in antitrust laws of industrialized countries may not be controlling, if the anticompetitive effects sought to be avoided by those laws are of a different magnitude or quality than the undesirable effects experienced by the transferees of technology in developing countries. For example, various types of exclusive dealing arrangements which have been found to violate the antitrust laws of the United States<sup>19</sup> and the EEC<sup>20</sup> might, in the context of a developing country enterprise, prove to be a necessary and desirable means of obtaining access to international markets.<sup>21</sup>

## II. THE PROPOSED CODES OF CONDUCT ON THE TRANSFER OF TECHNOLOGY

### A. Background

The first and most widely publicized of the proposed draft codes of conduct was submitted as a report of "The Working Group on Code of Conduct on Transfer of Technology of the Pugwash Conferences

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LEGISLATION IN JAPAN (1968). Subsection 1 of Section 6 of the Act concerning Prohibition of Private Monopoly and Maintenance of Fair Trade (Antimonopoly Act) prohibits an entrepreneur from entering into an international agreement which could constitute an unreasonable restraint of trade or an unfair business practice. The Guidelines are concerned especially with restrictions which are liable to constitute unfair practices. The Antimonopoly Act provides for post-notification of international agreements (Subsection 2 of Section 6) and measures providing for elimination of illegal agreements (Section 7). Not surprisingly, and in accord with the Japanese national character, there has been no litigation instituted by the Fair Trade Commission (FTC) under the Guidelines, because whenever a provision has been determined to violate the Antimonopoly Act, or its implementation through the Guidelines, the parties were contacted by the FTC and persuaded to modify or remove the offending provision. Before the Guideline came into effect in 1968, illegal restrictions had typically been removed from agreements in the process of screening them under the Foreign Investment Act [Hereinafter, the Japanese FTC Guidelines are cited as Japan, FTC Guidelines.]

19. See, e.g., *Standard Oil Co. of Cal. v. United States*, 337 U.S. 293 (1949) striking down exclusive supply contracts.

20. See, e.g., *Re the Agreement of Kali and Salz A.G.*, 13 Comm. Mkt. L. R. D1 (1973) striking down contract between the only two German potash fertilizer producers which required one to buy all of other producer's output.

21. Exclusive sales agreements may be the only viable way a developing country enterprise can market its products. The treatment of exclusive sales agreements by the proposed codes of conduct is discussed in note 64 *infra* and accompanying text.

on Science and World Affairs" at a meeting in Geneva, Switzerland conducted during April 1-5, 1974. This proposed code of conduct has come to be known as the "Pugwash Code." It was published and circulated by the United Nations Conference on Trade and Development (UNCTAD) on July 15, 1974 at the request of the Permanent Representative of Algeria, made in his capacity as Chairman of the Group of 77 at a session of the UNCTAD Intergovernmental Group on Transfer of Technology.<sup>22</sup> A code of conduct on transfer of technology has not yet been developed by UNCTAD itself. Efforts to draft such a code were begun by an intergovernmental group of experts under the auspices of UNCTAD in May of 1975. These efforts were continued at a meeting of the UNCTAD Intergovernmental Committee on Transfer of Technology which was held in Geneva from November 24 through December 5, 1975.

At the May 1975 UNCTAD meeting, the expert from Brazil submitted a revised draft outline for a code of conduct on behalf of the Group of 77.<sup>23</sup> The Group of 77 draft is, to a large extent, based on the Pugwash draft. Although the mandate of the May 1975 meeting was only to draft an outline of a proposed code of conduct, the Group of 77 proposal was a fully developed draft.<sup>24</sup> In response to this initiative by the Group of 77, the Group B countries developed still another proposed outline of a draft code in Paris on October 27-29, 1975, under the auspices of the Organization for Economic Cooperation and Development. A refined version of this draft was submitted by the expert from Japan on behalf of the experts from Group B as a "Revised Draft Outline for the Preparation of an International Code of Conduct on Transfer of Technology" at the UNCTAD Committee on Transfer of Technology meeting in Geneva on November 24, 1975.<sup>25</sup>

At the UNCTAD IV Conference held in Nairobi in May 1976, discussions on a code of conduct were overshadowed by intensive deliberations on world commodity pricing, distribution, and allocation.

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22. Pugwash Code, note 8 *supra*.

23. U.N. Doc. TD/B/C.6/14, Annex II (1975) [hereinafter cited as Group 77 Code].

24. The Group B countries strongly protested this overstepping of the May 1975 mandate to draft an "outline." See *Report of the Intergovernmental Group of Experts on a Code of Conduct on Transfer of Technology held at the Palais des Nations, Geneva, from 5 to 10 May 1975*, U.N. Doc. TD/B/C.6/1 at 11-12 (1975); *Report of the United States Delegation to the United Nations Conference on Trade and Development Intergovernmental Group of Experts on a Code of Conduct on Transfer of Technology, Geneva, Switzerland, May 5 to 10, 1975*, submitted to the Secretary of State by Delegation Chairman Robert B. Allen, at 3-4 (unpublished State Department Document).

25. U.N. Doc. TD/B/C.6/14, Annex I (1975) [hereinafter cited as Group B Code].



However, it was agreed that an intergovernmental group of experts would be established within UNCTAD, open to the participation of all member countries, to prepare a draft international code of conduct for the transfer of technology.<sup>26</sup> The group is to hold one meeting in 1976 and as many additional meetings as may be required in 1977 to draft, and hopefully reach agreement on, a proposed code by the end of 1977.<sup>27</sup> The group of experts is to be free to formulate draft provisions ranging from mandatory to optional, without prejudice to the final decision on the legal character of the code.<sup>28</sup>

As a part of the resolution adopted by the conference in Nairobi, UNCTAD recommended that a United Nations conference under its auspices be held by the end of 1977 and that the conference should negotiate the draft elaborated by the group of experts and take all decisions necessary for the adoption of a final document embodying the code, including the decision on its legal character.<sup>29</sup> The United States has agreed to participate in the meetings of the intergovernmental group of experts. The first meeting of the group of experts took place in November 1976 at UNCTAD's headquarters in Geneva.

The heart of each of these three draft codes is the chapter on restrictive business practices. The Pugwash Code enumerates 20 different clauses as restrictive business practices and identifies five clauses which "shall not be utilized" in technology transfer agreements involving the use of trademarks in Chapter III.<sup>30</sup> Chapter IV of the Group 77 Code has doubled this list of clauses forbidden as restrictive business practices.<sup>31</sup> In contrast, the Group B Code denominates in more general terms only eight categories of restrictive business prac-

26. UNCTAD Resolution 89 (XII), U.N. Doc. TD/RES/89(XII), para. 2 (1976).

27. *Id.*

28. *Id.*

29. *Id.* para. 3.

30. Pugwash Code, ch. IV, para. 4(i)-(xx) and ch. III, para. 5(i)-(v). While the text of the code prohibits the use of all twenty-five clauses, certain exceptions are recognized with regard to the five clauses involving the use of trademarks. Chapter III of the Pugwash Code is entitled "Relations Between Suppliers and Recipients of Technology."

31. Group 77 Code, ch. IV, para. 4.2(i)-(xl). Chapter IV of the Group 77 Code, entitled "Restrictive Business Practices in Transfer of Technology Transactions," includes a general catch-all provision prohibiting any clauses or practices in the technology transfer agreements which "directly or indirectly have or may have adverse effects on the national economy of the recipient country," *Id.* ch. IV, para. 4.1. It also provides for exemptions to the prohibitions of Chapter IV when required by the public interest. *Id.* ch. IV, para. 4.3. Furthermore, it should be noted that the Group 77 Code prohibits restrictive business practices "whether part of written arrangements or not . . ." *Id.* ch. IV, para. 4.2. Certain cartel activities are also treated in Chapter IV. See note 33 *infra* and accompanying text.

tices in Chapter V.<sup>32</sup> Additionally, using almost identical language, both the Pugwash and Group 77 Codes provide that the following horizontal cartel activities "shall not be utilized:" (1) import cartels; (2) rebate cartels and other price fixing arrangements; (3) national export cartels; (4) international cartels which allocate markets or control exports or imports; (5) private and semi-official agreements on certain standards in developing countries; and (6) specialization and rationalization cartels.<sup>33</sup>

Significantly, both the Group 77 Code and the Pugwash Code visualize that any code should be an internationally legally binding instrument. As stated in the Pugwash Code:

The Code of Conduct for Transfer of Technology should be the object of a multilateral legal instrument to be internationally negotiated and agreed upon, and to become binding on signatories once the conditions for its entry into force, to be established in the legal instrument itself, are fully met.<sup>34</sup>

Presumably, once sufficient informal support has been generated for a code of conduct, an attempt will be made to convene a diplomatic conference at which the terms of the proposed code will be hammered into the format of an international treaty to be ratified by the countries subscribing to the document drawn up by the diplomatic conference. Such a mode of proceeding would be similar to that which was adopted, for example, with the Patent Cooperation Treaty, to which the participating governments subscribed at a diplomatic conference held in Washington, D.C. in June 1970.<sup>35</sup>

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32. Group B Code, ch. V, para. 5.1(i)-(viii). Chapter V of the Group B Code is entitled "Restrictive Business Practices." It should also be noted that certain practices and clauses identified as restrictive business practices by both the Pugwash and Group 77 Codes, e.g., package licensing, are treated in the Group B Code, but not as restrictive business practices. *Id.* ch. IV, para. 4.1(i)-(v) (Chapter IV, "Responsibilities of Source and Recipient Enterprises").

33. Pugwash Code, ch. IV, paras. 6 & 7; Group 77 Code, ch. IV, para. 4.4. The Pugwash Code further lists cartels for the exchange of technical information and small-scale industry and marketing cartels. Pugwash Code, ch. IV, para. 7(v). With respect to these and the last three types of cartel activities enumerated in the text, the Pugwash Code specifies that "Any adverse effects of [such] cartel activities on the transfer of technology should be avoided." *Id.* ch. IV, para. 7. While apparently preserving the precondition of adverse effect, the Group 77 Code employs the less equivocal phrase "shall not be utilized" with respect to all the enumerated cartel activities. Group 77 Code, ch. IV, para. 4.4. While both Codes restrict the prohibition on horizontal cartel activities to those involving the transfer of technology, the Group B countries are almost certain to find the same logic applicable to horizontal cartel activities restricting access to raw materials, e.g., OPEC. See *Preparation of a Draft Outline on an International Code of Conduct on Transfer of Technology*, U.N. Doc. TD/B/C.8/AC.1/3 at 30 (1975) (Comments of the United States Government on Pugwash Code).

34. Pugwash Code, ch. X, para. 15 entitled "Implementation and Revision."

35. \_\_\_\_ U.N.T.S. \_\_\_\_ (1970).

Not surprisingly, the Group B countries take the position that any international code of conduct on technology transfer should be restricted to mutually acceptable and voluntary guidelines, rather than a legally binding code.<sup>36</sup> It is also interesting that the Group D countries have stated their general support for the preparation of a code of conduct, but they feel that such a code should be optional and allow for flexibility in the application of its provisions.<sup>37</sup>

## **B. Restrictive Business Practices in Technology Transfer Agreements<sup>38</sup>**

The prohibition or requirement of certain clauses in a contract for the transfer of technology, and particularly a license agreement, will have a direct impact on the transfer process. Therefore this article will discuss the economic impact of the restrictive business practices portions of the proposed codes on international cooperation in the transfer of technology. With the foregoing general observations in mind, attention is directed to specific clauses which might be prohibited, permitted, or required by a code of conduct. For convenience, the Pugwash Code will be used as a base against which provisions for any proposed code of conduct may be evaluated and considered. Accordingly, the remainder of this paper concerns itself with certain specific provisions taken from the Pugwash Code. Reference will be made by footnotes to corresponding provisions in the Group 77 and Group B Codes where such comparison may provide illumination or contrast. Because the Pugwash Code will undoubtedly be the parent of any proposed code put forward by the Group of 77 countries, and, of course, will also influence any voluntary code proposed by the Group B countries, this method of analysis seems appropriate. The quotations to which comparative reference is made below have thus been taken from the Pugwash Code. The practices and clauses discussed are those which have been identified as restrictive business practices in the Pugwash Code, and, accordingly, prohibited.

### **1. Tie-in Clauses.**

Tie-in clauses are "clauses and/or practices restricting the sources of supply of raw materials, spare parts, intermediate products and

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36. Group B Code, ch. I, para. 1.2; *Id.* ch. VIII, para. 8.2.

37. U.N. Doc. TD/B/C.8/1, para. 15 at 7 (1975).

38. See generally *Transnational Corporations: Issues Involved in the Formulation of a Code of Conduct*, U.N. Doc. E/C.10/17, paras. 103-107 at 26 (1976); R. Vernon, *Restrictive Business Practices*, U.N. Doc. TD/B/399 (1972).

capital goods . . . .”<sup>39</sup> A clause which requires the licensee to acquire raw materials, spare parts, intermediate products, or capital goods for use with the licensed technology only from the licensor or its designee generally should not be included in a licensing agreement. Such tie-in of unprotected goods is usually illegal under the United States anti-trust laws,<sup>40</sup> and has been criticized by representatives of developing country enterprises. It is likely that transferors will be amenable to such a prohibition in a code of conduct, if the prohibition is not totally inflexible. The benefit to the developing countries would be substantial.

There may be instances in which a licensor can justifiably refuse to guarantee the suitability or adequacy of the technology transferred, unless the supplies or capital goods acquired meet specifications set out in the agreement. The reasonableness of a licensor’s justification for a tie-in must be viewed in light of the technology, the necessity of supplies or capital goods of particular specifications, and the availability of compatible supplies or capital goods from other sources.

An absolute prohibition against tie-ins without any qualifications, as proposed in the Pugwash Code, might in some instances actually hinder the transfer of technology. For example, to maintain quality control it might be necessary for a transferor to insist that certain materials, spare parts, or components used in the exploitation of the technology be obtained from designated sources — at least for a limited period of time. Although such restrictions might be justifiable in only a very limited number of situations, such situations do exist and could render the prohibition impractical as worded.<sup>41</sup>

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39. Pugwash Code, ch. III, para. 4(ii). A footnote to this provision indicates that it is to be read in conjunction with ch. V, para. 8(vii) which provides that where no other sources exist, the prices of the materials shall be consonant with international price levels. See note 85 *infra* and accompanying text. See also Andean Group’s Decision No. 24, 11 I.L.M. 126, 133 (1972) Art. 20(a); Mexico’s Law for the Registration of the Transfer of Technology and the Use and Exploitation of Patents and Trade-Marks, adopted December 28, 1972, Article 7 (VI) [hereinafter cited as Mexican Law], and reprinted in U.N. Doc. TD/B/AC.11/13 (1973); and Japan, FTC Guidelines, Article I, para. (4). Both the Pugwash and Group 77 Codes address tie-ins of trademarked products in a separate provision. Pugwash Code, ch. III, para. 5(ii); Group 77 Code, ch. IV, para. 4.2(xvi). The only difference between the two codes in this regard is that the Pugwash Code does not denominate such clauses as restrictive business practices, while the Group 77 Code does.

40. See e.g., *International Salt Co. v. United States*, 332 U.S. 392 (1947).

41. The Group 77 Code contains a virtually identical provision. Group 77 Code, ch. IV, para. 4.2(iii). The Group B Code identifies “tied sales” as a restrictive business practice and defines the practice as coercing the licensee “[T]o accept unwanted and unneeded licenses, or purchase unwanted and unneeded goods or services from the licensor or his designated source.” Group B Code, ch. V, para. 5.1(iii). It should also

## 2. Package Licensing.

Package licensing has been defined as "clauses and/or practices requiring the acceptance of additional technology not desired by the recipient, as a condition for obtaining the technology in question, and requiring the remuneration for such additional technology, e.g. package licensing . . ."<sup>42</sup> The prohibition against tying may be extended to a requirement that the licensee accept additional, unnecessary, and unwanted technology as a condition for the transfer of the desired technology. It is the coercive or mandatory aspect of the arrangement which should be avoided.<sup>43</sup>

This prohibition should not prevent package licensing when the elements of the package can be shown to be necessary, desirable, and unavailable elsewhere. Thus, in some instances, a particular technology, although not required for the desired technology to be complete, is known by the licensor to be necessary or highly desirable for best results. In such a situation, the burden of showing the desirability of accompanying technology should be on the licensor. If it is determined that the same technology is not available locally or from another source, the licensee can decide whether the benefits of the accompanying technology are indeed worth the additional cost.

The disaggregation or "unbundling" of packaged technology and the consideration of each element of a package are not unreasonable restraints on licensing. Such an approach permits the developing country enterprise to bargain for and ensure that it receives only that technology which is necessary to achieve the desired result. Permitting disaggregation may cause particular apprehension on the part of a transnational desiring to have a signed contract before disclosing its trade secrets or know-how. Furthermore, the transnationals may doubt the ability of those in the developing countries to properly evaluate the need for certain elements of the package to achieve the desired result. These shortcomings of disaggregation should not adversely affect the transfer of technology if the developing country enterprises

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be noted that the Group 77 Code includes a separate prohibition of tie-ins with respect to trademarked products. Group 77 Code, ch. IV, para. 4.2(xvi). *See also, Id.* ch. IV, para. 4.2(xx1) concerning tying of imports to specific source for purpose of charging higher than normal prices.

42. Pugwash Code, ch. III para. 4(iv).

43. *Zenith Radio Corp. v. Hazeltine Research Inc.*, 395 U.S. 100 (1969); *American Securit Co. v. Shatterproof Glass Corp.*, 268 F.2d 769 (3rd. Cir. 1959) *cert. denied*, 361 U.S. 902 (1959).

make a positive effort to assure the transferors that their technology will be competently and confidentially evaluated.<sup>44</sup>

### 3. Tie-out Clauses.

Tie-out clauses are "restrictions in obtaining competing or complementary technology through patents and know-how from other licensors with regard to the sale or manufacture of competing products . . . ."<sup>45</sup> Clauses which restrict the transferee from obtaining competing or complementary technology from other licensors or the public domain should be prohibited. Such clauses are illegal "tie-out" provisions under United States antitrust law.<sup>46</sup> Tie-out clauses adversely affect the sense of autonomy of developing country enterprises. Transferors of technology will understand the important interest in preserving the identity and self-determination characteristics of developing country enterprises. In turn, the transferees should recognize the legitimacy of the technology owners' desire to secure a good ROI and an adequate reward for release of their property rights.

### 4. Price Fixing.

Price fixing involves "clauses and/or practices whereby the supplier of technology reserves the right to fix the selling or resale price of the products manufactured . . . ."<sup>47</sup> Transferors should be prohibited from attempting to fix the price at which the licensee may sell or resell licensed products or products made by using licensed technology. Al-

44. All three proposed codes apparently agree that disaggregation will have a salutary effect on the transfer process. See Group B Code, ch. IV, para. 4.1(iii); Group 77 Code, ch. IV, para. 4.2(xx). See also Andean Group's Decision No. 24, 11 I.L.M. 126, 133 (1972) Art. 19.

45. Pugwash Code, ch. III, para. 4(vi). The Group 77 Code contains an identical provision in ch. IV, para. 4.2(ii). In addition, both the Pugwash and Group 77 Codes contain a similar prohibition on tie-outs with respect to products involving trademarks. *Id.* ch. IV, para. 4.2(x); Pugwash Code, ch. III, para. 5(v). See also Andean Group's Decision No. 24, 11 I.L.M. 126, 133 (1972) Art. 20(d); Mexican Law, Article 7 (VIII); and Japan, FTC Guidelines, Article I, para. (3). It is also to be noted that the Group B and Group 77 Codes identify restrictions on the transferee's freedom to enter into sales or representation agreements related to similar or competing technologies as a restrictive business practice. Group B Code, ch. V, para. 5.1(iv) (only unreasonable restrictions); Group 77 Code, ch. IV, para. 4.2(xii). See note 60 *infra* and accompanying text.

46. *Standard Sanitary Mfg. Co. v. United States*, 226 U.S. 20 (1912); *National Lock-washer Co. v. George K. Garrett Co.*, 137 F.2d 255 (3d Cir. 1943). The same is true under the EEC law. See *A.O.I.P. v. Beyrard*, 17 Comm. Mkt. L. R. D14 (1975).

47. Pugwash Code, ch. III, para. 4(viii). The Group 77 Code contains a similar provision, Group 77 Code, ch. IV, para. 4.2(xiv), while the Group B Code fails altogether to treat the issue of price fixing. See also Andean Group's Decision No. 24, 11 I.L.M. 126, 133 (1972) Art. 20(b); Mexican Law, Article 7(XI); and Japan, FTC Guidelines, Article I, para. (2).

though the licensor may affect the sale price by the royalty rate it sets, it should not attempt to *fix* the price. Such action has been held to be illegal under the United States and EEC antitrust laws.<sup>48</sup>

##### *5. Production Volume Restraints.*

Production volume restraints are "clauses and/or practices restricting the recipient's volume, scope and range of production or field of activity . . . ."<sup>49</sup> Clauses which restrict the volume of production of a licensed process may be prohibited as outside the reasonable scope of the property rights of the licensor in the licensed technology.<sup>50</sup> However, clauses which restrict the volume of the licensed product, such as a patented product, should not be absolutely barred.<sup>51</sup>

Treating volume restriction clauses in any code of conduct requires a careful balancing of factors. Any restraint on volume has a clear limiting effect on the licensee's potential competitive posture in world markets. Moreover, it comprises an indirect influence on the developing country enterprise's self-guidance by the transnational licensor. These are negative consequences of legitimate concern to the developing country. However, the adversity of these restraints may be more illusory than real. Even without production restraints, developing country companies are not likely to be able to compete in international markets as quickly or effectively as they desire. Moreover, the ability to barter for more favorable terms in other negotiable aspects of the transfer

country enterprise's hand. Obviously, an outright prohibition of these restraints takes away that "chip."

Volume restrictions are usually included to preserve the competitive positions of the licensor and his other licensees. Where the licensor holds a product patent, the argument that it thereby has the legitimate power to control competition in the licensed product has some force. If each of the parties to a production license recognizes a reasonable correlation between the scope of the transferor's property rights and the restriction on production, the negotiating climate will be improved.

The developing country enterprise can still trade off any concession respecting production in exchange for concessions on other negotiable conditions of the agreement. The transnationals will appreciate that their legitimate interests have been considered in the adoption or rejection of a prohibition on production restraints in the code of conduct.

Where the licensor's property rights reside in a process for making a product, clauses which restrict product volume are far less defensible. An ancillary right to control the product market cannot be reasonably asserted because such a claim clearly exceeds the scope of the licensor's property right. Not only does the basis for the transferor's justification for the restriction weaken, but the adversity of the impact on the transferee heightens. Thus, the interference with a developing country enterprise's autonomy becomes more serious as the relationship between the restriction and the reasonable scope of the transferor's property rights is more tenuous. Also, where the protected technology covers manufacturing rather than the product itself, the transferee's ability to compete effectively in world markets with the acquired technology may actually be impeded by product volume restrictions.

This treatment of volume restrictions illustrates the balancing approach to decision-making with respect to code of conduct provisions which should be followed. This approach gives vent to the substantial arguments on both sides and reaches a demonstrably fair and considered decision. In this case where the strengths of the arguments for and against product volume restrictions are dependent upon whether the protected technology is the product itself or only the process for making the product, a more selective prohibition of production restrictions (i.e., where it is the process that is licensed) is a reasonable, justifiable decision in drafting the code of conduct.

## *6. Export Restrictions.*

Export restrictions include "clauses and/or practices prohibiting or limiting in any way the export of products manufactured on the



basis of the technology in question including restrictions on exports to certain markets, permission to export only to certain markets; and requirement of prior approval of the licensor for exports . . . clauses and/or practices requiring higher technology payments on goods produced for exports vis-a-vis goods for the domestic market . . ."<sup>52</sup> The code of conduct treatment of clauses which restrict export of the products resulting from the licensed technology should be based on a balancing of factors similar to those weighed in connection with volume restrictions.

Export restrictions should be prohibited where unreasonable. What constitutes reasonableness with respect to any export restriction will depend on the nature of the licensed technology, the licensor's reasons for imposing the restriction, and the scope and duration of the restriction.<sup>53</sup> There can be sound reasons for export restrictions. For example, a licensor will often have an exclusive licensee in each of one or more territories, and may wish to protect one licensee's market from competition by goods imported by another licensee. Developing

52. Pugwash Code, ch. III, para. 4(1) & (v). A footnote to the first clause addressing export restrictions recognizes that in "certain appropriate circumstances export restrictions might be justified." The Group B and Group 77 Codes likewise identify export restrictions as restrictive business practices. The Group B Code, however, addresses only those restrictions which "unreasonably prevent the export of unpatented products or components, or which unreasonably restrict exports to countries where the product made pursuant to the licensed technology is not patented." Group B Code, ch. V, para. 5.1(f). In contrast, the Group 77 Code contains outright prohibitions on any type of export restrictions, recognizing no circumstance where such restrictions are permissible. Group 77 Code, ch. IV, para. 4.2(xi) & (xv). It does, however, permit differential rates of payment for export output vis-a-vis domestic output where such rates are "in the interest of the recipient country." *Id.* ch. IV, para. 4.2(xiii). It is interesting to note that this is one of the few instances where the Group 77 Code adopts a more flexible position than the Pugwash Code which simply prohibits differential technology payments. Both the Pugwash and Group 77 Codes also address export restrictions in the context of cartel agreements among technology suppliers. See note 33 *supra* and accompanying text. See also Andean Group's Decision No. 24, 11 I.L.M. 126, 133-35 (1972) Arts. 20 and 25(a) and Mexican Law Article 7 VII; the Japanese FTC Guidelines quite sensibly provide that, although it will be considered an unfair business practice for a licensor to restrict the area to which his licensee may export licensed products, there are three exceptions under which an export restriction will not be considered an unfair business practice. These are: (1) where the licensee has patent rights in a territory to which the licensee is restricted from exporting; (2) where the licensor is already selling licensed product in the restricted area under his normal business practice; and (3) where the licensor has already granted an exclusive license to a third party to sell in the restricted area. Japan, FTC Guidelines, Art. 1, para. (1).

53. *Brownell v. Ketchum Mfg. Co.*, 211 F.2d 121 (9th Cir. 1954); *United States v. Crown Zellerbach Corp.*, 411 F. Supp. 118 (N.D. Ill. 1956); *United States v. Parker-Rust-Proof Co.*, 61 F. Supp. 805 (E.D. Mich. 1945). See also *Consten and Grundig-Verkauf-GmbH v. EEC Commission*, CCH Comm. Mkt. Rep. 7618 (1966) (Export Restrictions under Treaty of Rome) Cf. *A.O.I.P. v. Beyrard*, 17 Comm. Mkt. L. R. D14 (1975); *Re Kabelmetal's Agreement*, 16 Comm. Mkt. L. R. D40 (1975).

country licensees frequently prefer exclusive licenses for their territories because of the limited host country market which often exists.<sup>54</sup> Thus, the absolute prohibition of export restrictions can be detrimental to all concerned under certain circumstances.

However, the recipient usually hopes to be able to export eventually. A restriction on export should therefore be limited in scope and duration to that which is reasonable. A break-in period during which the licensor can establish its position in its own market, or during which other licensees can develop strength in their home territories, is a reasonable time. The length of the break-in period will depend upon the relative complexity of the technology.

Transnationals are accustomed to the availability of territorial restrictions reasonable in scope and duration under the antitrust laws of the United States.<sup>55</sup> An inflexible prohibition of such restrictions would be difficult for technology owners to accept, and should be considered too severe an external restraint on the transfer negotiation process. It would be sufficiently protective of the developing country interests to prohibit only export restrictions which are clearly unjustifiable or unreasonable.

Export restrictions, no matter how reasonable, can only be imposed on the licensee. It is outside the scope of property rights in the technology for a licensor to attempt to restrict a customer of the licensee. Clauses which purport to do so can be prohibited.<sup>56</sup> A clause which requires higher royalty payments for items produced for export than for domestic items is a form of export restriction which should be treated in the same manner as other export restrictions.

## 7. Field of Use Restrictions.

Field of use restrictions are "clauses and/or practices restricting

54. The problem of limited domestic markets in developing countries and the impetus that provides for protection of local industries is explored in the Latin American context in *The Process of Industrialization in Latin America*, INTER-AMERICAN DEVELOPMENT BANK at 77-90 (1969). See generally R. PREBISCH, CHANGE AND DEVELOPMENT — LATIN AMERICA'S GREAT TASK at 236-39 (1971); C. FURTADO, ECONOMIC DEVELOPMENT OF LATIN AMERICA — A SURVEY FROM COLONIAL TIMES TO THE CUBAN REVOLUTION at 197-204 (1970).

55. See *United States v. Arnold Schwinn & Co.*, 388 U.S. 365, 380-81 (1967); *Shin Nippon Koki Co. v. Irvin Industries, Inc.*, 186 U.S.P.Q. 296 (N.Y. Sup. Ct. 1975).

56. See *Adams v. Burks*, 84 U.S. (17 Wall) 453 (1873); *Hensley Equipment Co. v. Esco Corp.*, 383 F.2d 252 (5th Cir. 1967); *U.S. v. Glavo Group Ltd.*, 410 U.S. 52 (1973); *Consten and Grundig-Verkauf-GmbH v. EEC Comm'n*, OCH Comm. Mkt. Rep. 7618 (1966); *Deutsche Grammophon v. Metro-SB-Grossmarkt GmbH* 10 Comm. Mkt L.R. 631 (1971). The latter two cases were decided under EEC antitrust law.

the recipient's volume, scope and range of production or field of activity . . . ."<sup>57</sup> Much of the technological property available from trans-nationals can be used in diverse fields of activity or to produce diverse products. Under principles of U.S. antitrust law, it is not unreasonable to permit the licensor of multifaceted technology to license various uses of the technology separately.<sup>58</sup>

To require the licensor to license the technology without any restrictions on use could force the licensor to charge higher royalties to the licensee, even though the licensee desires only a limited use of the technology. Reasonable field of use restrictions are deemed legal under the U.S. antitrust laws, so long as such restrictions are not used as a subterfuge to divide markets or allocate customers between competitors.<sup>59</sup>

### 8. *Unilateral Grant-Back Provisions.*

Unilateral grant-back provisions establish "a unilateral flow of technical information and improvements from the technology recipient without reciprocal obligations from the technology supplier. All new technologies, patents and improvements developed by the technology recipient as a result of the agreement shall be the property of the technology recipient . . . ."<sup>60</sup> An inflexible prohibition against any unilateral grant-back provision should not be incorporated into a code of conduct. However, in recognition of the transferee's rights in self-generated improvement technology, a mandatory requirement for a grant-back of title or an exclusive license should not be included in transfer agreements. A grant-back of a non-exclusive license permitting the licensor to use improvement technology developed by the licensee,

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57. Pugwash Code, ch. III, para. 4(vii). See Group 77 Code, ch. IV, para. 4.2(i) which is the same. The Group 77 Code contains a second and somewhat redundant provision prohibiting field of use restrictions. *Id.* ch. IV, para. 4.2(xxxvi).

58. General Talking Pictures Corp. v. Western Electric Co., 305 U.S. 124 (1938), *aff'd*, 304 U.S. 175 (1938). The Japanese Guidelines explicitly condone field of use restrictions as being proper. Japan, FTC Guidelines, Article III, paras. (1), (2), and (3).

59. *Id.*

60. Pugwash Code, ch. III, para. 4(vi). The Group B Code takes the position that an exclusive grant-back, where the effect of the same is "to abuse a dominant position of the licensor," is a restrictive business practice. Group B Code, ch. V, para. 5.1(viii). The Group 77 takes a slightly more lenient position than the Pugwash Code. It prohibits exclusive grant-backs unless there is a reciprocal obligation on the technology supplier. Group 77 Code, ch. IV, para. 4.2(xxvii). See also *Id.* ch. IV, para. 4.2(vxx) which prohibits compelling recipient to obtain improvements from supplier and para. 4.2(xxxi) which prohibits limitation on recipient's access to improvements. See also Andean Group's Decision No. 24, 11 I.L.M. 126, 133 (Art 20(f)); Mexican Law, Article 7(IV); and Japan, FTC Guidelines, Article I, para. (7).

whether or not royalty-bearing should not be prohibited, even absent a reciprocal grant-back provision running to the transferee.<sup>61</sup>

The licensor has a legitimate interest in improvements of its own technology. Where the technology owner is without assurance that improvements spawned through the transfer will be available to it at least on a nonexclusive basis, the transfer itself would be discouraged. Moreover, the grant-back of a nonexclusive license is not an undue imposition on the interests of the developing country enterprises. Such provisions could frequently lead to royalty income for the transferee. In addition, a grant-back constitutes a reasonable concession by which the transferee may be able to secure more favorable terms under other provisions of the agreement during the negotiation process.

The transferor should additionally not be prevented from acquiring through a grant-back a nonexclusive license which includes the right to sublicense. Such a clause may serve to reassure the licensor, and enable the transferee to reduce royalties or secure other terms more favorable than it could otherwise negotiate. By licensing improvements to the transferor, the developing country enterprise may be able to reach a greater share of the world market for the particular technology and receive a greater return on its improvements.

#### 9. *Limitations On Transferee with Respect to Research and Development.*

These clauses involve "limitations on the research and development (R&D) policy and activities of the recipient company . . ." <sup>62</sup> License agreements should not include limitations on the policy or activities

61. In *Transparent-Wrap Mach. Corp. v. Stokes & Smith Co.*, 329 U.S. 637 (1947) (5-4 decision), it was held that an assignment grant-back was not a *per se* antitrust violation and could be legal under the Rule of Reason. But the U.S. Department of Justice currently views as unlawful any grant-back provision other than a non-exclusive license. See also *Re Kebelemetal's Agreement*, 16 Comm. Mkt. L. R. D40 (1975); Raymond-Nagoya, CCH Comm. Mkt. Rep. ¶9513 (1973). Both of these cases uphold nonexclusive grant-backs under EEC antitrust law.

62. Pugwash Code, ch. III, para. 4.(x). The Group 77 Code includes a similar provision, Group 77 Code, ch. IV, para. 4.2(xxvi), as well as a provision prohibiting restrictions on the recipient's ability to adapt the imported technology to local "appropriate circumstances." *Id.* The Group B and Group 77 Codes contain similar provisions. Group B Code, ch. V, para. 5.1(vii) (only when unjustifiable); Group 77 Code, ch. IV, para. 4.2(xiii) (giving due regard to subcontracting arrangements). Similarly, the Group B and Group 77 Codes identify restrictions on the technology recipient's freedom to enter into sales or representation agreements regarding similar or competing technologies as a restrictive business practice. The Pugwash conditions, *Id.* ch. IV, para. 4.2(xxii). See also Mexican Law, Article 7(V). The Group B Code takes a conciliatory posture in urging source enterprises to "[c]o-operate to the extent practicable and appropriate, in the development of the scientific and technological resources of recipient enterprises . . ." Group B Code, ch. IV, para. 4.1(iv).

of the developing country licensee with respect to R&D. Such a restriction is outside the scope of the transferor's rights and unduly interferes with the transferee's autonomous conduct of its own affairs. Developing country enterprises should not be prevented from achieving competitive technologies through their own independent efforts.

In prohibiting such activities by a licensor, however, the provision should not be drafted so broadly as to condemn any clause which might arguably have the indirect effect of limiting the transferee's research activity under some strained or extended construction of the terms of the provision. For example, as indicated above, nonexclusive grant-back provisions should be permitted under certain circumstances. A loosely worded policy statement could give rise to the contention that any grant-back provision constitutes a "limitation" on developing country research activity. A prohibition in any code of conduct should address clauses which purport to directly affect the R&D policy and activities of the transferee which are not ancillary to the rights of the technology owner. This is a reasonably specific and justifiable restraint on the transfer negotiation process.

#### *10. Quality Control Clauses.*

Quality control clauses are "clauses and/or practices using quality controls or product standards by the supplier as a means of introducing unwarranted requirements on the technology recipients . . .".<sup>83</sup> Quality control and product standards may be very important for technology which is closely tied to the reputation of the licensor, such as when an associated trademark or service mark is also licensed, or when a poor quality product might be injurious to health. In such instances the imposition of quality control inspections or rigid product standards through clauses in the license agreement can be justified. Clauses imposing such requirements which are not reasonably necessary should be excluded from transfer agreements. The Pugwash Code apparently recognizes this distinction by prohibiting such clauses only where they are used to impose "unwarranted requirements" on the technology recipient.

#### *11. Exclusive Sales or Representation Agreements.*

Exclusive sales or representation agreements are "clauses and/or practices requiring the recipient of technology to enter into exclusive sales or representation agreements with the supplier of technology

<sup>83</sup> Pugwash Code, ch. IV, para. 4(iii). The Group 77 Code, ch. IV, para. 4.2(iv) is the same.

...<sup>64</sup> Clauses under which the licensee agrees to enter into exclusive sales or representation agreements with the licensor should not be prohibited without exception. For example, where the protected technology resides in a product which requires continuous monitoring and servicing in the hands of the consumer, such as automobiles, exclusive representation agreements with the licensor may be desirable and advantageous. However, where such clauses are imposed involuntarily on the transferee as a condition of the technology transfer, they are properly prohibited. If the licensee voluntarily agrees to enter into such exclusive arrangement, the clause should be permitted.

### *12. Royalty Payments in Form Other than Currency.*

Royalty payments in form other than currency are "clauses and/or practices obliging the recipient to convert technology payments into capital stock . . ."<sup>65</sup> Clauses in licensing agreements which require the payment of royalties in a form other than currency, for example, stock in the licensee, should not be prohibited unless the form of payment is involuntarily imposed upon the licensee or is contrary to the policies of the host country. If the transferee is coerced to convert payments into stock as a condition for license, the clause should be prohibited. In such a case, it becomes essentially the type of tie-in that is almost universally regarded as illegal.<sup>66</sup>

### *13. Clauses Requiring Licensor Participation in Management.*

The clauses are "requirements by the supplier in licensing arrangements, except management contracts, to participate in the management decisions of the recipient enterprise . . . [or] requirements to use the staff designated by the technology supplier . . ."<sup>67</sup> Involuntarily imposed clauses which require licensor participation in licensee management or management decisions, or which mandate the use of staff designated by the licensor, should not be included in agreements.

64. Pugwash Code, ch. III, para. 4(ix). The Pugwash Code does, however, note that such agreements might be justified in some circumstances but the Group 77 Code is silent on this matter. Group B Code, ch. V, para. 5.1(iv) (unreasonable restrictions only); Group 77 Code, ch. IV, para. 4.2(xii). See also Mexican Law, Article 7 (IX) & (XII), and Japan, FTC Guidelines, Article 1, para. (5).

65. Pugwash Code, ch. III, para. 4(xii). See Group 77 Code, ch. IV, para. 4.2(xviii) which is the same. The Andean Group's Decision No. 24 11 I.L.M. 120, 134 (1972) Art. 21, contains a similar provision.

66. See note 39 *supra* and accompanying text.

67. Pugwash Code, ch. III, para. 4(xiii) & (xiv). See Group 77 Code, ch. IV, para. 4.2(xxix) & (xxviii) (parallel provisions). See also Mexican Law, Article 7 (III) & (X). The Group 77 Code also includes a provision prohibiting restrictions on or requiring prior approval by the technology supplier of the recipient's publicity or advertisement policies. *Id.* ch. IV, para. 4.2(xvii).

However, the licensor may justifiably refuse to guarantee production levels or other aspects of the license agreement unless it is permitted to participate to some extent in key decision-making processes of the licensee.<sup>68</sup>

#### 14. Attempts to Exact Royalties in the Absence of Valid Property Rights.

These clauses include "licensee's undertaking not to contest the validity of the supplier's patents . . . restricting the use of the subject matter of a patent and any unpatented know-how license which relates to the working of the patent once the patent has expired . . . the charging of royalties on patents after their expiry . . ." <sup>69</sup> Attempts to insure continuation of the license even though the property rights no longer exist are not justifiable. Such clauses are unenforceable under United States law.<sup>70</sup> Thus, a license agreement should not include clauses which prohibit the developing country licensee from challenging the validity of the licensor's property rights or which require payments to continue after the property rights have expired or been extinguished. Clauses by which the licensee agrees not to challenge the validity of the licensor's patents should be prohibited.<sup>71</sup> Payments extending beyond the life of the patent or after technical trade secrets or know-how have entered the public domain, other than through breach of a confidentiality agreement by the licensee, should likewise be barred.

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68. See note 49 *supra* and accompanying text.

69. Pugwash Code, ch. III, para. 4(viii), (ix) & (x).

70 To require payment of royalties on use of a patented invention after the patent has expired is *per se* unlawful in the United States, *Brulotte v Thys Co.*, 379 U.S. 29 (1964). The EEC Commission has taken the same view under Art. 85 of the Treaty of Rome. See *A.O.I.P. v. Beyrard*, 17 Comm. Mkt. L. R. D14 (1975). All three codes are in complete agreement that royalty payments on expired patents should be barred. Group B Code, ch. V, para. 5.1(v), Group 77 Code, ch. IV, para. 4.2(xviii). The Group B Code is in accord with the Pugwash Code in also barring any restrictions on the exploitation of a licensed product or process after the expiry of the patent, Group B Code, ch. V, para. 5.1(v), while the Group 77 Code, somewhat surprisingly, makes no specific mention of this practice. It does, however, contain an additional provision which prohibits the royalty payments on patents and other industrial property rights not registered in the recipient's country. Group 77 Code, ch. IV, para. 4.2(xvii).

71. See *Lear, Inc. v. Adkins*, 395 U.S. 653 (1969). See also *American Sterilizer Co. v. Sybron Corp.*, 526 F.2d 542 (3rd Cir. 1975); *Re Kachelmetal's Agreement*, 16 Comm. Mkt. L. R. D40 (1975); *Davidson Rubber*, 11 Comm. Mkt. L. R. D52. The last two cases hold that non-attack clauses are prohibited under EEC antitrust law. The Group 77 Code treats non-attack or no-contest clauses in the same manner as the Pugwash Code. Group 77 Code, ch. IV, para. 4.2(xvii). In contrast, the Group B Code prohibits only "unreasonable" restrictions prohibiting the licensee from challenging the validity of a patent, and further provides that the licensor may terminate the license when the patent is challenged by the licensee. Group B Code, ch. V, para. 5.1(vi).

### 15. Restrictions On Use After Expiration of the Agreement.

These clauses concern "requirements that the recipient pay royalties during the entire duration of manufacture of a product or the application of the process involved and, therefore, without any specification of time . . . clauses and/or practices prohibiting or restricting the use of the technology after the termination or expiry of the contract in question . . .".<sup>72</sup> It has been suggested that clauses which restrict the use of transferred technology after the expiration of the transfer agreement should be prohibited. This would not be an advisable code provision. A distinction must be drawn between restraints on use or royalty payments after expiration of property rights and similar restraints after expiration of the agreement. In the absence of valid property rights, the transferor has no legitimate claim to royalties or control on use. In the absence of an agreement, however, it is the transferee which lacks a right to use technology protected by valid property rights. Clauses which restrict use of unexpired property rights after agreement expiration are therefore proper.<sup>73</sup>

It is understandable that a developing country recipient of technology would want to be assured, once it undertakes production using the licensed technology, that it will not be required to cease production while the technology continues to have commercial feasibility. However, this is a consideration which should be resolved by proper planning and negotiation of the terms of the agreement. Where the agreements involve the transfer of valuable trade secrets or know-how, a clause restricting the licensee's disclosures of the secret information after the expiration of the agreement is a valid exercise of the transferor's property rights. When a licensor transfers technology in the form of trade secrets and know-how, it must be assumed that the technology will be held in strict confidence by the licensee.<sup>74</sup>

72. Pugwash Code, ch. III, para. 4(xv) & (xvi). The Group B Code does not contain any comparable provisions. The Group 77 Code includes two parallel provisions, Group 77 Code, ch. IV, para. 4.2(vi) & (vii) as well as a third rather vague provision prohibiting contractual agreements of "unduly long duration." *Id.* ch. IV, para. 4.2(xxxv).

73. The right of a trade secret owner to protect his trade secrets against their unauthorized use by one to whom they had been disclosed in confidence was recently upheld by the United States Supreme Court in *Kewanee Oil Co. v. Bieron Corp.*, 416 U.S. 470 (1974). See *Re Kabelmetal's Agreement*, 16 Comm. Mkt. L. R. D40 (1975) which reached the same result under EEC antitrust law.

74. The Group B Code identifies the preservation of the confidentiality and proprietary nature of trade secrets, know-how and all other secret information acquired in the transfer process as a responsibility of both source and recipient enterprises, Group B Code, ch. IV, para. 4.3(v) & (vi). See *Re Kabelmetal's Agreement*, 16 Comm. Mkt. L. R. D40 (1975); *Burroughs/Geha* 11 Comm. Mkt. L. R. D72 (1971), *Burroughs/Delpinque* 11 Comm. Mkt. L. R. D67 (1971); summarized, 1 CCH Comm. Mkt. Rep. ¶2412.18.



Normally, the agreement will endure for the predicted commercial life of the technology. Indeed, it is in the interest of both the transferee and transferor to fix the period of the agreement to correspond to the expected commercial life of the technology. A clause providing for renegotiation of the agreement after a certain period of time may help to provide some assurances of the transferee's continued ability to use the technology if the commercial life should prove longer than originally expected.

#### 16. *Unused Technology.*

Unused technology clauses require "continuation of payments for unused or unexploited technology . . .".<sup>75</sup> The licensee should not be coerced into accepting a license for technology which it cannot use. This principle is directly analogous to the objection to mandatory package licensing, previously discussed.<sup>76</sup> However, if a licensee has demanded, bargained for, and received technology which it later discovers it cannot use, a royalty schedule which is based to some extent on the unused technology should not be considered *per se* unreasonable.<sup>77</sup> The proper selection of royalty base can minimize the problem of payments for unused technology. Developing country enterprises should seek a basis for running royalty payments which will produce royalty figures that bear a direct relation to their actual extent of use of technology. The license agreement could also include a provision for renegotiation should it become apparent to the parties that, contrary to their original expectations, some portion or field of the technology transferred cannot be used by the licensee.

#### C. Guarantees

Both the Pugwash and Group 77 Codes include separate chapters on guarantees.<sup>78</sup> A minor exception notwithstanding,<sup>79</sup> the Group B

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75. Pugwash Code, ch. III, para. 4(xvii). See Group 77 Code, ch. IV, para. 4.2(xix). See also Andean Group's Decision No. 24, 11 I.L.M. 126, 133-35 (1972) Arts. 20(g) & 25(d).

76. See notes 42-43 *supra* and accompanying text.

77. Under U.S. law, a licensor cannot condition the granting of a license on the licensee's agreeing to pay royalties on total sales of a class of products where all the products of the class are not covered by the transferred technology, unless the licensee voluntarily agrees to such an arrangement for convenience of bookkeeping and accounting or the like. *Zenith Radio Corp. v. Hazeltine Research, Inc.*, 395 U.S. 100 (1969); accord, *Davidson Rubber*, 11 Comm. Mkt. L. R. D52.

78. Pugwash Code, Ch. V; Group 77 Code, ch. V.

79. This exception provides that source enterprises shall guarantee: "(a) [T]he technology meets the description contained in the technology transfer agreement; (b) the technology, properly used, is suitable for the use specifically set forth in the technology transfer agreement." Group B Code, ch. IV, para. 4.1(vi).

Code fails entirely to address the matter of guarantees. The Pugwash Code lists nine guarantees which the supplier of technology is required to make, and five guarantees which the recipient of technology must make. The Group 77 Code contains a slightly different list of guarantees for both suppliers and recipients of technology, omitting one of the recipient's guarantees contained in the Pugwash Code.<sup>80</sup> Moreover, the Group 77 Code goes on to list eight optional guarantees, evidently to be imposed on both parties to a transfer agreement, which may be required by the governments of technology-receiving countries.<sup>81</sup> The following discussion will focus on several of the more important guarantees in terms of impact on the technology transfer process, required by the Pugwash Code.

### *1. Guarantees of Suitability.*

The Pugwash Code has several provisions addressing guarantees of suitability:

[T]he technology acquired is in itself suitable for the manufacture of products covered by the agreement; the content of the technology transferred is in itself full and complete for the purposes of the agreement; the technology obtained will in itself be capable of achieving a predetermined level of production under the conditions specified in the agreement . . . .<sup>82</sup> [T]he acquired technology will be used as specified in the contract . . . .<sup>83</sup>

The licensor should reasonably be required to guarantee that the transferred technology is suitable for the purposes intended under the agreement, if the technology is used in accordance with conditions specified in the agreement. For such a guarantee to be meaningful, the agreement should specifically define the intended products or goals of the agreement, as well as conditions necessary to achieve them. This

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80. The recipient guarantee omitted from the Group 77 Code would require the recipient to guarantee that the socio-economic conditions and needs of the recipient country have been taken into account in the transfer agreement. Pugwash Code, ch. V, para. 9(v). It should be noted, however, that this omission in the Group 77 Code may not be very significant in view of the fact that several related guarantee obligations may be imposed on both parties to the transfer agreement at the option of the government of a recipient country under the terms of the Group 77 Code's chapter on guarantees adverted to in the text. Group 77 Code, ch. V, para. 5.3. The Pugwash Code does not contain any optional guarantee provisions.

81. Group 77 Code, ch. V, para. 5.3.

82. Pugwash Code, ch. V, para. 8(i), (ii) & (iii). See Group 77 Code, ch. V, para. 5.1(i), (ii) & (iii) which is the same. See also Group B Code, note 79 *supra* and accompanying text.

83. Pugwash Code, ch. V, para. 9(i). See Group 77 Code, ch. V, para. 5.2(i). It should be apparent that this last guarantee is to be made by the technology recipient, while the first three guarantees, note 79 *supra*, are to be made by the technology supplier.

would include specifications for particular raw materials if appropriate. Requirements for success should not be a sham, however, and the transferor should establish a sound basis for concluding that a given condition is essential to the realization of the desired results.

In general, the licensor should not be expected to warrant the suitability of technology without some assurance that the licensee will use it properly. A code of conduct should be sufficiently flexible in its prohibitions of clauses to allow the parties to include clauses which may appear to be restrictive in return for a valuable guarantee. Clauses guaranteeing that the transferred technology is complete, or that a predetermined level of production can be achieved, stand in the same posture as a guarantee of suitability. A licensee should be willing to tolerate, at least to some extent, the stipulation of specific conditions of production or use which are reasonably related to the achievement of the desired results in return for either type of guarantee. A code of conduct must be flexible enough to allow the parties to decide for themselves wherein lies the most suitable trade-off of clauses, yet definitive enough to provide the transferee with leverage to permit it to participate significantly in reaching that decision.

## *2. Guarantee to Train Recipient Country Personnel*

This type of guarantee requires "national personnel shall be adequately trained in the operation of the technology to be acquired and in the management of the enterprises . . .".<sup>84</sup> A code may contain a provision requiring a clause under which the licensor agrees to train management and labor in the proper use of the transferred technology. Such a provision is generally acceptable to the licensor as a means of insuring the success and profitability of the license.

Difficulties arise where the guarantee is to train such personnel adequately. A licensor cannot reasonably be expected to warrant the quality, motivation, and learning ability of trainees over whom it has no direct control. It is fair to require a licensor to provide adequate training capacity. For the licensor to do less would be counterproductive to its own interests. However, the ultimate responsibility for providing qualified trainees should be on the licensee and the recipient country.

Unfortunately, the determination of whether the licensor has provided the capability to train recipient country personnel and whether the licensee has provided qualified trainees is so largely subjective,

<sup>84</sup>. Pugwash Code, ch. V, para 8(iv). See Group 77 Code, ch. V, para. 5.1(iv) which is the same.

that attempts to enforce a training guarantee can lead to undesirable disputes not easily resolved. Disagreements over the quality of the training provided the personnel could threaten the harmonious relationship between the transferor and transferee and should be avoided.

### 3. *Guarantee of Comparable Prices.*

These guarantees require the prices of the articles be consonant with current international price levels "where the recipient of the technology has no other technological alternative than acquiring capital goods, intermediate inputs and/or raw materials from, or selling his output to, the technology supplier or any source designated by him . . . ."<sup>85</sup> If it is necessary for the licensee to acquire materials or capital goods from the licensor or its designee, a requirement that the licensor guarantee that the prices of such materials or capital goods will be comparable to the international market price is entirely reasonable. Problems may arise where no comparable international market price exists for a particular item, as is frequently the case with intermediate inputs, *e.g.*, the frame for an automobile. This problem could be overcome by establishing a standard accounting practice which specifies a formula for pricing such items.

### 4. *Licensor-Originated Improvements.*

These guarantees provide "the recipient shall be informed and supplied with all improvements on the techniques in question during the lifetime of the agreement . . . ."<sup>86</sup> Generally, a requirement that the licensee be supplied with all licensor-originated improvements to the licensed technology for the term of the agreement will not be acceptable to the licensor. However, the licensee should be informed of the improvements, and be offered the opportunity to acquire a license to them on reasonable terms.

Improvements to technology are expensive to develop and have the effect of extending the market life of the technology. Unlike licensee-originated improvements derived from the use of the licensed technology,<sup>87</sup> the licensee has no particular claim of interest in licensor-originated improvements. The imposition of such a clause could require the licensor to contract away an unknown improvement which might

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85. Pugwash Code, ch. V, para. 8(vii). See Group 77 Code, ch. V, para. 5.1(vi) which is the same.

86. Pugwash Code, ch. V, para. 8(vi). The Group 77 Code adopts a more flexible posture in its parallel provision. It merely requires a guarantee of "access" to all improvements. Group 77 Code, ch. V, para. 5.1(v).

87. See note 39 *supra* and accompanying text.

vell be worth more than the original technology. Such a result would be unreasonable and could jeopardize transfer agreements. For example, if a licensor transferred technology for making rayon synthetic fibers and then later discovered and developed the technology for making nylon, it would be unreasonable to require the licensor to turn over the new nylon technology to the licensee without additional consideration.

### 5. *Spare Parts at No Further Cost.*

This type of guarantee provides "for certain period of time the supplier shall guarantee to provide spare parts, components, and servicing of the technology without additional charges . . ." <sup>88</sup> A clause requiring the licensor to supply, without additional charge, all necessary spare parts, components and servicing for a specified period of time may be difficult to enforce in practice. That is, the licensee may pay for the guarantee by being unable to persuade the licensor to agree to a lower royalty rate than would be attainable without the guarantee.

The licensee may be better off to negotiate an individually-priced guarantee of spare parts, components and servicing, and thus preclude an unearned windfall for the licensor should the licensor's necessarily speculative prediction of parts and servicing cost be higher than the actual cost. A code of conduct requirement for such a no-additional-cost guarantee may therefore have the effect of introducing inflexibility into the negotiations rather than improving the transferee's bargaining posture.

### 6. *"Most Favored Licensee" Clauses.*

"[A]ll transfer of technology arrangements should include a provision by which if licensor grants more favorable terms to a second licensee these terms will be automatically extended to the first licensee . . ." <sup>89</sup> A most favored licensee clause should not be required by a code of conduct. Such clauses could frustrate many technology transfer negotiations and cause considerable difficulty in the interpretation and enforcement of agreements in which the clause has been included.

88. Pugwash Code, ch. V, para. 8(viii). See Group 77 Code, ch. V, para. 5.1(viii) which is the same.

89. Pugwash Code, ch. V, para. 8(ix). The Group 77 Code's most favored licensee guarantee differs from that of the Pugwash Code in two significant ways. First, it is included in the list of optional guarantees which may be required by governments of technology-receiving countries. Moreover, it requires most favored licensee treatment to be extended only to "subsequent recipients in similar positions within the same country." Group 77 Code, ch. V, para. 5.3(iv).

A major problem is the correct valuation of the license. To determine whether a subsequent licensee has obtained more favorable terms, the two licenses must be compared with respect to the value of the technology licensed, the variety of methods of compensation used in each license, and the value or detriment of the restrictions placed on the licensee and licensor in each license. It is extremely difficult to compare the value of two licenses if the technology is not precisely the same in both licenses. This is frequently the case with respect to transfers where the transferred technology is individually tailored for each recipient enterprise.<sup>90</sup> For example, where only a patent is licensed to one recipient and another receives a license for the same patent with know-how, trade secrets, or management assistance, a comparison of the values of the respective licenses is an uncertain effort. If a later license transferring more technology than an earlier license contains a most favored licensee clause, the later licensee might expect the same royalty rate as the earlier licensee, despite the fact that the later licensee receives more technology. Such a situation would be unacceptable to the licensor.

Many licenses have more than one form of payment. One license may have only a royalty provision, while a second license may have a lower royalty due to inclusion of a grant-back clause or exclusion of certain guarantees. The value of the inclusion or exclusion of various clauses is speculative, making a comparison based strictly on royalty rate unfair and inequitable. In addition, where one license incorporates restrictions on the licensee's exports or use of the technology on termination of the agreement, it cannot be compared with another license which does not include those restrictions. Each clause in a license has some value to each of the parties. This value depends on all the other clauses, on the priorities of the parties, and on the possible benefits or detriments each clause offers to each party. There is no way to compare such inchoate, speculative values fairly.

The most favored licensee clause also presents a special problem arising out of the national regulations of many developing countries. Some countries have established a relatively low maximum royalty rate. In those countries, the licensor may be able to license at that

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90. Despite the protestations of the developing countries that the technology they receive from the developed countries is ill-suited to their needs, i.e., too capital intensive, developed country transferors frequently must make significant modifications to their technology when it is destined for use in a developing country. Moreover, certain kinds of technology are inherently capital intensive, e.g., telecommunications. The "appropriateness" of the technology transferred to developing countries is explored in W. CAUNSON & L. WELLS, *The Acquisition of Technology from Multinational Corporations by Developing Countries*, U.N. Doc. ST/ESA/12 at 3-22 (1974).

mandatory rate by receiving favorable terms on other aspects of the agreement. Some countries impose a maximum time period during which a license may remain in effect. The term of a license can be a basis for setting the payment level. A five-year licensee may justifiably pay royalties at a rate different from that of a ten-year licensee. These are examples of recipient country regulations which render the most favored licensee clause particularly unacceptable to transnationals transferring technology into the developing countries.

The essence of the deficiencies of most favored licensee clauses is the nature of the transfer negotiation process itself. Each license is ideally the product of individual negotiations, and, unless exactly the same, no two licenses can be compared to determine which one has more favorable terms. To reduce transfer agreements to simplistic terms for purposes of comparative valuation would destroy the unique nuances and intricacies inherent in every agreement arrived at through a process of negotiation.

#### D. Other Issues Raised by the Proposed Codes of Conduct

While the foregoing analysis has been confined to the chapters of the proposed codes which address restrictive business practices and guarantees in the technology transfer process, several more general issues emerge from other chapters of the proposed codes which are likely to generate considerable discussion and controversy. Therefore, it would be useful to summarize briefly the most significant of these issues, for they will establish the overall context from which a code of conduct on the transfer of technology will emerge.

##### 1. *The Nature and Scope of the Code.*

As previously indicated,<sup>91</sup> the Group B and Group D countries have taken the position that any code of conduct should be voluntary and not legally binding.<sup>92</sup> Both the Pugwash and Group 77 Codes envisage a multilateral international accord, binding on its signatories.<sup>93</sup>

Inextricably related to the determination of the mandatory/voluntary, legal/nonlegal nature of the code is the issue of its coverage or scope of application. Again, the difference in approach between the

91. See notes 36-37 *supra* and accompanying text.

92. See Group B Code, ch. VIII, para. 8.2.

93. See Pugwash Code, ch. X, para. 15; Group 77, Preamble. See generally, U.N. Centre on Transnational Corporations, *Transnational Corporations. Issues Involved in the Formulation of a Code of Conduct*, U.N. Doc. E/C.10/17 at 5-9 (1970) for a discussion of the nature of a general code of conduct.

Pugwash and Group 77 Codes, on the one hand, and the Group B Code on the other, is striking. The Pugwash Code, after broadly defining the term "technology transfer,"<sup>94</sup> provides that the code will "[a]pply to all transactions covering the transfer of technology regardless of the parties involved whether private capital, state or regional or international institutions."<sup>95</sup> The Group 77 Code employs similarly sweeping language in describing the scope of the Code's application, and goes beyond the Pugwash provision by explicitly providing that the Code "[s]hall be universally applicable to all States . . . ."<sup>96</sup> Predictably, the Group B Code contains a much narrower definition of the term "international transfer of technology,"<sup>97</sup> and provides that the guidelines are "addressed" only to "parties" to a technology transfer transaction, *i.e.*, the source and recipient enterprises<sup>98</sup> and their governments. The difference in meaning between "apply" and "applicable" as used in the Pugwash and Group 77 Codes and "addressed" used in the Group B Code is significant. The former intend the Code to be legally binding while the latter intends the Code to be advisory or exhortatory in nature.

The resolution of these disparate positions on the nature and scope of a code of conduct underpins the entire discussion of a code of conduct on the transfer of technology, and will significantly flavor the language, prohibitions, and guarantees to be included in the final version of such a code. It is here that the debates between the developed and developing countries will be most intense. For these reasons, the Group of 77 could well abort the entire effort by adamantly insisting on a universally applicable code, binding sovereign states and private parties alike. The Group B governments will not countenance such an agreement, and they will further point out that the Pugwash and Group 77 proposals totally fail to recognize the actual limits on the ability of the government of a developed country to regulate its private enterprises.

## 2. *Special Treatment of Developing Countries.*

All three codes agree that some provision should be made for special treatment of the developing countries.<sup>99</sup> As with the scope of

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94. Pugwash Code, ch. II, para. 2.

95. *Id.* ch. II, para. 3.

96. Group 77 Code, ch. II, para. 2.2.

97. Group B Code, ch. II, paras. 2.4-2.5.

98. Group B Code, ch. II, paras. 2.1-2.3 and 2.7.

99. Pugwash Code, ch. IX; Group B Code, ch. VI, paras. 6.2 & 6.3, Group 77 Code, ch. VI.



the code, the nub of contention here is that both the Pugwash and Group 77 Codes purport to impose obligations on developed country governments to take certain steps, *e.g.*, grant preferential tax treatment and develop local R&D capacity. Insisting on the imposition of such obligations on developed country governments would significantly lessen the possibility of attaining an agreement on any code of conduct. The developing countries should exhibit the same kind of sensitivity to encroachments on the sovereignty and autonomy of developed country governments as they do to like encroachments by the transnationals on their own sovereignty.

### 3. *Applicable Law in Technology Transfer Agreements.*

Both the Pugwash and Group 77 Codes provide that the jurisdiction and interpretation of technology transfer agreements shall rest with the technology-receiving country.<sup>100</sup> The Group B Code provides that the parties should be free to negotiate the applicable law and in the absence of an effective choice of law by the parties, the law of the State which has the most significant relationship to the parties and the transaction should govern.<sup>101</sup> Since all three codes would permit arbitration by procedures specified by the parties, the applicable law provisions of the three codes appear sufficiently flexible to arrive at a meaningful compromise.<sup>102</sup>

### 4. *Collective Bargaining.*

While the term "collective bargaining" does not appear as such in any of the three proposed codes, the concept entered into the discussion of a code of conduct on international transfer of technology at the Fourth Session of UNCTAD held in Nairobi in May 1976. There are, however, certain provisions in the Group 77 Code which can be viewed as antecedents of the concept that surfaced at the Nairobi meeting. Specifically, the Group 77 Code includes a provision which requires developed country governments to extend or strengthen "[A]ssistance for the establishment of national, regional and/or international institutions, including technology transfer centres, to help the developing countries to obtain their technological requirements

100. Pugwash Code, ch. VII, para. 12(i) & (ii); Group 77 Code, ch. VIII, paras. 8.1-8.2.

101. Group B Code, ch. VII, paras. 7.1-7.3.

102. Pugwash Code, ch. VII, para. 12(iii) & (iv), Group 77 Code, ch. VIII, para. 8.3; Group B Code, ch. VII, para. 7.4. Both the Pugwash and Group 77 Code would permit recourse to arbitration only where the applicable law does not preclude the same. The Group B Code also urges the use of the International Centre for the Settlement of Investment Disputes. *Id.* ch. VII, para. 7.5(1).

for the establishment, construction and operation of plants under the most favorable terms and conditions."<sup>103</sup>

The notion of collective bargaining, *i.e.*, joint planning and negotiation by developing countries with respect to the transnational technology supplier, was explicitly endorsed by the Fourth Session of UNCTAD as a means of enhancing the bargaining position of developing country technology recipients.<sup>104</sup> While the concept of collective bargaining among sovereign states has been explored in other contexts,<sup>105</sup> *e.g.*, commodity producers and consumers, it is a novelty in the technology transfer area. Because the UNCTAD resolution endorsing collective bargaining by the developing countries was couched in very general and abstract terms, meaningful discussion and analysis of this concept must await a more specific elaboration of how the principle of collective bargaining will operate in the technology transfer area.

Suffice it to say that should the collective bargaining tactic which is now being advocated by the developing countries lead to the legitimization of cartel activities under the guise of collective bargaining, the developed countries will strongly resist such a development. On the other hand, should the operational content of the collective bargaining concept indicate a good faith effort by the developing countries to promote the ideal situation of an "arm's length" negotiation between two evenly matched parties, the developed countries would likely be receptive to such an approach.

### III. CONCLUSION

Individual negotiation and compromise are paramount values of any system affecting technology transfer agreements. These values should be preserved and encouraged, and throughout this analysis of clauses which might be prohibited, permitted, or required by a code of conduct, those have been key goals.

Any code of conduct promulgated and sponsored by UNCTAD in the future should strive to favor neither the transnational supplier

103. Group 77 Code, ch. VI, para. 61(vi). The Group 77 Code contains one other provision which adverts to the idea of collective bargaining on a regional basis. *Id.* ch. VII, para. 7.2.

104. UNCTAD Resolution 87(IV), U.N. Doc. TD/RES/87 (IV) at 3 (1976).

105. See, *e.g.*, Hager, *Commodity Agreements and the Developing Countries: - A Collective Bargaining Approach*, 7 INT. LAW. 309 (1973); T. Franek and E. Chesler, "At Arms' Length": The Coming Law of Collective Bargaining in International Relations Between Equilibrated States, 15 VA. J. OF INT'L. LAW 579 (1975).



Whether or not a code of conduct on the transfer of technology eventually becomes a reality, the discussion and interchange between the developed and developing countries which the concept itself has brought about has value in itself. Given the central role of the transnationals in this controversy, the suggestion that they are indeed engines of world peace — insofar as their activities present problems which require solutions involving cooperative action between the developed and developing world — acquires a certain validity.

In the realities of today's world it would seem that before any code of conduct can come into practical effect there will have to be at least a partial voluntary adoption and approval of its terms by both the transnationals and their home governments. Before this can occur there will have to be much give and take on the part of both the transnationals and the developing countries.

The initial efforts to draft codes favorable to the developing countries, as represented by the Pugwash and Group 77 proposals, are too inflexible and go beyond anything that the transnationals would be willing to voluntarily accept. A meaningful, workable, practical, and flexible code will require large doses of compromise on both sides. Accustomed as the transnationals are to operating in an environment where external restraints, such as antitrust laws, are imposed, they should be willing to agree to some form of code containing voluntary provisions, as well as some legally binding provisions. The acceptability of such a compromise would be particularly viable if the legally binding prohibitions were directed against restrictive provisions that have been generally recognized as illegal under United States, EEC, and Japanese antitrust principles, such as price fixing and tie-out provisions.

It is interesting to observe that since Pugwash was first put forward, the Group B countries have moved from outright opposition to any form of code regulating international technology transfer to their own proposal, the Group B Code. The dialogue has thus begun. Where it will lead is unpredictable, but its future path and eventual outcome will be stimulating to follow.

The resolution of the debate over the code is unquestionably one of the most vital components needed to bring\* about a resolution of the broader North-South conflict, and the peaceful resolution of that conflict is the most important issue facing the world today.

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# A REPORT AND SOME POLICY CONSIDERATIONS PREPARED BY THE TASK FORCE ON THE TRANSFER OF TECHNOLOGY, CHAMBER OF COMMERCE OF THE UNITED STATES, EXECUTIVE SUMMARY

The report is a working document prepared by a task force of the Chamber of Commerce of the United States as a contribution to the current international and domestic debate on the implications of technology transfer for national policies. It does not necessarily reflect either official policy positions or recommendations of the Chamber of Commerce of the United States.

## 1. OVERVIEW

The report, "Technology Transfer and the Developing Countries," is addressed to business and government in the United States, and also to government and business leaders in developing countries and in the international organizations that speak for them. It seeks to alert the various interests concerned with technology transfer to the misconceptions, misunderstandings, and counterproductive policies that currently threaten the transfer of technology to developing countries, and therefore the development process itself. The report makes a series of suggestions for improving the climate for technology transfer, and calls for a continuing dialogue among interested parties in both developed and developing countries, with a view to increasing the understanding on all sides without which the transfer of technology cannot continue.

## 2. THE PROBLEM

The transfer of technology is essential to the drive of developing countries to close the gap that stands between their people and the standard of living in the industrialized countries. The developing countries have recently come to realize this truth; in their eagerness to acquire technology, however, they have taken some steps, and are contemplating others, that misconceive the character of technology and reduce the chances for its effective transfer. These steps include at the national level restrictions on royalties, restraints on the scope of licensing arrangements, and cancellations by fiat of agreements entered into in good faith; at the international level, they center around proposals, especially in UNCTAD, for a mandatory "code of conduct" that would greatly weaken the protection for patents and other intellectual and industrial property, negate the value of many kinds of know-how, and would urge upon states the creation of a legal environment hostile to many of the traditional and mutually beneficial arrangements for technology transfer.

## 3. THE NEED FOR A POLICY

The major industrialized nations of the West, while realizing the importance of technology to economic stability and growth, have not yet developed an integrated policy on the subject of industrial property in the context of north-south relations. As a result, the developed countries are on the defensive in international forums, and individual firms are uncertain about where to turn when their practices are questioned and their arrangements are attacked. Moreover, the United States and other developed countries have not taken stands on abuses in this area comparable to stands taken in respect of abuses concerning trade or investment, and consequently the developing countries have less and less felt the constraints that affect their actions in other areas of economic activity.

## 4. WHAT IS TECHNOLOGY TRANSFER?

Technology, as the task force sees it, is both property and process. It includes not only patents, designs, and technical data, but also the ability to put things together, to make things work, and to maintain efficient operations and uniform quality. There are many difficult ways in which technology is transferred—by license, investment, joint venture, technical assistance, employment, education, or some combination of these techniques. What all transfer of technology has in common, however, is that it is voluntary on the part of both transferor and transferee. Technology transfer not only should not, but it cannot be compelled.

## 5. OBSTACLES TO TECHNOLOGY TRANSFER

### (a) National Legislation

A growing number of developing countries in recent years have grown suspicious of technology transfer and of the payments associated with such transfer. In

the Andean Pact countries, for instance, all arrangements for royalty and related payments must be registered and justified, and a variety of such arrangements are disapproved, including payments from subsidiaries to parents. Brazil, Argentina, and Mexico have similar laws, in some cases excluding whole fields (such as pharmaceuticals) from patent protection, denying or limiting the duration of foreign trademarks, and modifying by government decree existing contractual arrangements. While the experience with these new laws and regulations is not yet in, the grounds for concern are compelling.

#### (b) *International Codes*

A number of international bodies, led by UNCTAD, have been working on mandatory codes of conduct to restructure the legal environment for technology transfer. In the guise of eliminating "restrictive practices" such codes would prohibit many normal arrangements for the transfer and preservation of technology, and would weaken many of the protections that the owners of industrial property now enjoy. Though the United States and most developed countries have indicated that they would not adhere to a code of conduct along the above lines, the issue must be taken seriously, because whatever code is finally adopted will call on states that adhere to it to change their domestic laws to put the code's structure into force. Once a code of conduct is adopted, it may well serve as a mandate to developing countries to act in accordance with the "new international law," regardless of existing arrangements or their individual needs.

### 6. "RESTRICTIVE PRACTICES"

The leaders of the drive on technology by the developing countries have built on partly understood literature of American antitrust law to propose outlawing some 40 different practices—some illegal even in the United States, some capable of being abused, and many perfectly justified and legitimate. The task force believes that corporations should be prepared to explain and justify their arrangements, for instance, to protect quality, maintain uniformity, but that developing countries should be prepared to listen to reasonable business-related explanations and not to condemn out of hand. Further the task force believes that firms based in the United States should not engage in practices abroad that they would not, or could not, engage in at home; correspondingly, developing countries should not impose requirements on foreign based firms that they would not impose on their own enterprises.

### 7. THE CONCERNS OF LABOR

Concern has recently been expressed by organized labor in the United States that the transfer of technology abroad means the transfer of jobs as well. The task force believes (i) that the facts do not bear out this contention, though individual examples doubtless exist; (ii) that technology cannot be bottled up, and in peace time its export cannot be controlled, and (iii) that restraints on exports of technology in the United States would simply be met by more technology transfer from other industrial countries, leading in the long run to a greater loss in jobs for American workers. As with other areas of economic exchange—trade and investment, for example—the task force believes not in placing a wall around the country but in sponsoring, where necessary, retraining, adjustment assistance, and above all, continued research and development to keep the American worker the most productive one in the world.

### TOWARD A POLICY ON TECHNOLOGY TRANSFER

Without reaching final conclusions on a set of recommendations, the task force thought it useful to put forth the following suggestions, for consideration by the U.S. Government, by foreign governments, and by the business community in the United States and abroad.

1. The United States Government—alone or in collaboration with other developed countries and the international lending agencies—should undertake a campaign of education concerning the potentials of technology transfer for economic development, and the dangers if incentives to such transfer are replaced by disincentives.

2. The United States should react to impairment or threats of impairment of industrial property rights as it does to the impairment of rights of American citizens in tangible property, to that end respect for industrial property rights

should form part of the agenda in bilateral relations between the United States and developing countries, as do treaty commitments, obligations under GATT and comparable matters.

3. Technical assistance, educational exchanges, and similar arrangements with developing countries should be conditioned on a receptivity to transfer of technology in accordance with agreements freely concluded.

4. The problems of technology transfer should be the subject of a continuing dialogue, not just among government officials, but among business executives, industrial managers and educators in both developed and developing countries.

5. The United States Government should establish an office that could serve as the central focus where both business firms and transferee nations can take problems arising in connection with arrangements to transfer technology. Over time, such an office might also serve as the focus for coordinating policy on this subject with other OECD countries.

6. The United States Government should actively encourage the exchange of technology between companies based in the United States and developing countries. It should develop a system of incentives to compensate for disincentives presently prevailing in many developing countries; such incentives might include insurance protection and tax deferrals or credits for transfers to developing countries, except those that had rendered themselves ineligible by taking arbitrary actions to undermine existing arrangements.

7. Developing countries should be advised that certain benefits normally available to them, such as duty-free treatment for their products, might be withdrawn with respect to products made in contravention to technology transfer arrangements.

8. Arbitration of disputes should become accepted components of arrangements for the transfer of technology.

9. The United States and the American business community should encourage the establishment of national and regional research and development institutions, to serve as a link between developing countries and the international scientific and industrial community.

10. The United States and all other countries should support the World Intellectual Property Organization in its role as the non-political custodian of the major international conventions in the field of patents, trademarks, and copyrights.

11. We look forward to the United Nations Conference on Science and Technology scheduled for mid-1979, we welcome the continuing discussions of technology transfer in UNCTAD, but hope that no open split between those who have and between those who need technology is precipitated by premature adoption of a mandatory "code of conduct."

12. The American business community looks to the United States Government for leadership in improving the conditions for technology transfer, protecting technology already transferred, and clearing the international atmosphere of the suspicion that threatens the development process itself.

The full report, "Technology Transfer and the Developing Countries," is available from the Chamber of Commerce of the United States, 1615 H Street, NW., Washington, D.C. 20002. Price: \$5.00. Request publication No. 6615 when ordering.

Senator STEVENSON. Thank you, Mr. Sharman?

Mr. SHARMAN. Thank you. I welcome this opportunity to testify before the Subcommittee on American labor's views on the important issue of technology transfer to less developed countries. Too often U.S. policy governing our international economic relations has been formulated without consultation with the labor movement and without regard to the short-term and long-term impacts on working people in the United States.

In the manufacturing sector, the United States' comparative advantage in international trade lies in our superior technology. It is this technology that enables American labor to be competitive with lower paid workers abroad. But it should be recognized that American workers are not merely the beneficiaries of our Nation's technology. As taxpayers, to a large extent they have also financed that technology.



The American taxpayer picks up most of the tab for research and development, including that conducted by corporations and universities. This year alone these research and development activities will cost \$40.8 billion. Fifty-three percent of this research and development, including 67.3 percent of all basic research, will be funded by the Federal Government.

Recently, the group of 77 countries have demand the removal of all restrictions on the transfer of technology from the industrialized countries.

In view of the high rate of unemployment in the United States and the poor prospects for its rapid reduction, it should surprise no one that the American labor movement looks at these demands with alarm. If you think such alarm is uncalled for, let me tell you how hundreds of members of my union lost their jobs through a direct transfer of technology from the United States to Brazil.

Until a few years ago, Brazil was the leading purchaser of light aircraft from the United States. But then the Brazilian Government decided it needed more jobs for Brazilian workers and to save foreign exchange. First, it levied prohibitive tariffs on the import of U.S.-made light aircraft.

Then since it didn't have the technology to build its own planes, it invited an American manufacturer, Piper, to bring U.S. technology to Brazil and produce with Brazilian workers. Brazil is now not only selling light aircraft to other Latin American countries and Africa, displacing U.S. exports, but is planning to export planes to the United States. It is typical of our Government's trade policies that while Brazil has effectively banned imports of U.S. aircraft, Brazil can sell freely in our market.

There is nothing wrong with Brazil, or any other nation, looking after the needs of its own labor force. All I am suggesting is that it is time for the U.S. Government to do the same.

During the last few months we have witnessed the closing of obsolete steel mills in the United States, while at the same time steel mills using the latest technology are going into production throughout the developing world. Since these mills cannot possibly reach economical levels of capacity utilization based on LDC markets, inevitably they are going to add to the world's excess steel capacity seeking export markets at any price.

We have also seen the Zenith Co., one of the last manufacturers of television sets and high fidelity equipment in the United States, being forced by import competition to transfer its operations overseas to low wage countries.

This move has left thousands of American workers unemployed with little chance of finding equivalent jobs.

During a visit I made to Taiwan a few months ago, I was able to see for myself a modern television plant, an ultramodern steel mill, a shipyard using the latest technology and an American-owned air maintenance facility that is producing parts for the Boeing 747 and soon plans to build small planes under license from Piper Aircraft for crop spraying in Australia.

Among the numerous products requiring high technological input being made throughout the lesser developed world are small aircraft in Brazil, computers in Romania, aircraft parts in Mexico, digital

watches in Hong Kong, electronic products in Korea and steel in Venezuela. There are also modern shipyards in both Korea and Singapore. It is obvious from this that the priorities of the less-developed countries of the world are to have prestige industries which are capital intensive and which do little to relieve the plight of the millions of unemployed and the poverty stricken.

As a result of the expansion of multinational corporations a small, very rich elite has been created in most of the less developed countries and little has been done to help those that need it most.

The trickle-down theory has never worked in practice, and factory workers in the less developed world who have been earning subsistence level wages in many countries have not been able to obtain wage gains equivalent to the rise in inflation.

In Hong Kong last year, multinational corporations in the electronics industry, including some which are American-owned, fought legislation that would have guaranteed industrial workers 6 days vacation a year, in spite of the fact that wages are among the lowest in the world and working conditions are a disgrace.

With this attitude, there is little hope that workers, who in most of the less developed countries are denied the most basic trade union freedoms and rights, are the ones that would benefit from a further technological giveaway, which would in turn deprive workers in the United States of jobs and create further insecurity among workers that are employed. We, in the labor movement, do not believe that we are doing the poor nations and the poor people of the world any favors by following policies that are destructive of our own best interests.

The economies, as well as the security of the so-called free world, which ironically includes some of the most repressive regimes on the face of the earth, depend on the economic, as well as the military strength of the United States.

If our economy goes down the drain, because our Government and business leaders continue to encourage the removal of our technology and the dismantling of entire industries, the economies of all these other countries will go right down with it.

Unless there is something done to relieve this situation, the long-term consequences on the citizens of the United States could be far more serious than anything that could happen in the less developed world.

There are those in the United States that contend that we can become a service economy, but the American labor movement sees this as being completely unrealistic.

Even many of our trade union friends from the lesser developed countries realize that if we continue to undermine our industrial base, we will be in no position to assist anybody, and they have realistically taken the position that if it is at the expense of the American workers, they don't want our industries.

American trade unionists, on the other hand, would like to see the workers in the less-developed countries raise their standard of living to our level, and have no intention of seeing our standards lowered to theirs. We in American trade unions recognize that a free trade union is one of the prerequisites for sound and economic advancement, for those at the lower levels of society.

We, therefore, view with alarm the one party system and the military dictators of the less developed world who often deny their own citizens the most basic human rights and trade union freedoms.

This makes us very doubtful that the transfer of industrial technology or any giveaway program can have any real beneficial impact on the large numbers of poverty stricken people in the less developed world.

In most LDC's such technology transfers have only resulted in widening the gap between the rich and poor in each respective country.

Another factor that has to be taken into consideration is that with a free flow of technology there would be no way to control the arms buildup in the less developed world, and we could end up by indirectly supplying the means of repressing those we are trying to assist.

In conclusion, I believe that the longer range goals of U.S. policy should be to relieve the misery of hunger and malnutrition among the poor in the less developed countries by supplying the kinds of technological know how that can be easily applied to improve agricultural production.

The latest technology in medicine and health care should also be made readily available.

Under no circumstances should any capital intensive technology be transferred more easily, and no technology that has been developed with the use of public funds should be transferred without the lead-time that is necessary to keep us in the United States competitive.

It is obvious that until now labor participation in the preparation of policy has been negligible, as there seems to be a tendency to ignore those who would be most affected by any changes made.

If labor has any role at all in implementing a policy, it should be to screen any technological transfer that could adversely affect workers in the United States.

[The statement follows:]

STATEMENT OF BENJAMIN A. SHARMAN, INTERNATIONAL AFFAIRS REPRESENTATIVE,  
INTERNATIONAL ASSOCIATION OF MACHINISTS AND AEROSPACE WORKERS

My name is Benjamin Sharman, and I represent the International Association of Machinists and Aerospace Workers, a trade union of 940,000 members in the United States and Canada.

I welcome this opportunity to testify before the Subcommittee on American labor's views on the important issue of technology transfer to less developed countries. Too often United States policy governing our international economic relations has been formulated without consultation with the labor movement and without regard to the short-term and long-term impacts on working people in the United States.

In the manufacturing sector, the United States' comparative advantage in international trade lies in our superior technology. It is this technology that enables American labor to be competitive with lower-paid workers abroad. But it should be recognized that American workers are not merely the beneficiaries of our nation's technology. As taxpayers, to a large extent they have also financed that technology.

The American taxpayer picks up most of the tab for research and development, including that conducted by corporations and universities. This year alone these R. & D. activities will cost \$40.8 billion. Fifty-three percent of this R. & D. including 67.3 percent of all basic research, will be funded by the Federal Government.

a right to demand government responsibility for using it to create new products, more jobs, better working conditions and general prosperity in the United States.

They have a right to demand government responsibility to provide a foundation of rising productivity sufficient to offset foreign wage differentials and thus make it possible for American-made products to compete in world markets.

Unfortunately, multinational corporations are no longer satisfied with the profits that can be made from the labor of American workers. There is far more to be made by combining American technology with the labor of women and children in Asia and Latin America. These multinational corporations have been permitted to expropriate the results of R. & D. that have been paid for by the American people. These corporations have taken what is rightfully the property of all the people and transferred it abroad for their private gain.

The less developed countries naturally want to obtain technology from the industrialized countries under the most favorable possible conditions. It has been claimed that once technology exists, it has already been paid for, and therefore it costs virtually nothing to transfer it to developing country enterprises.

Realistically viewed, however, technology is a commodity just like petroleum, bauxite or coffee, and as such it has a commercial value. To say that everyone benefits from the free flow of technology is just like saying that everyone would benefit if Saudi Arabia gave away its oil.

The removal abroad of U.S. technology began with low-skill, labor-intensive industries, such as shoes, textiles and leather, but has steadily progressed to higher skilled industries. Our government's trade, tax and tariff policies make it more profitable for U.S. corporations to locate in Taiwan or Mexico than in Tennessee or Missouri. As a result, while business demands new tax breaks to encourage more capital investment, American companies have been making 25 percent of their investment overseas in recent years.

And when they go, they take American technology, machinery and know-how with them.

But 25 cents-an-hour labor can't afford to buy the products produced with American technology, and so much of the output is sold in the U.S. market. The AFL-CIO estimates that between 1969 and 1973, a \$22 billion rise in imports of manufactured goods resulted in the loss of 346,000 U.S. factory jobs.

Title V of the Trade Act of 1974 unilaterally gave 140 less developed countries duty-free access to the U.S. market for over 2,700 manufactured products, including many from industries where high unemployment prevails. Many of the items are high technology products. This Generalized System of Preferences has been a further encouragement to U.S.-based multinational corporations to relocate their operations overseas. They can now take advantage not only of the low wages, tax incentives and frequently repressive labor laws of less developed countries, but also receive duty-free treatment when importing their goods for sale in the United States.

Contrary to the conventional wisdom embodied in U.S. Government policy, economics textbooks and newspaper editorials, the American consumer has benefited little from these policies. As Sidney Margolius, a consumer affairs expert, pointed out in the August, 1977 issue of the *American Federationist* magazine, the supposed price advantage of imports from low-wage countries often has disappeared, many imported products have serious safety hazards, and even where prices are low, the quality is often low as well, especially in apparel and shoes, but also in electrical goods such as household appliances. Low import prices are not passed on to consumers, but are absorbed in higher mark-ups by wholesale distributors and retailers.

Recently, the UNCTAD countries have demanded the removal of all restrictions on the transfer of technology from the industrialized countries. In view of the high rate of unemployment in the United States and the poor prospects for its rapid reduction, it should surprise no one that the American labor movement looks at these latest demands with alarm. If you think such alarm is uncalled for, let me tell you how hundreds of members of my union lost their jobs through a direct transfer of technology from the U.S. to Brazil.

Until a few years ago, Brazil was the leading purchaser of light aircraft from the United States. But then the Brazilian Government decided it needed more jobs for Brazilian workers and to save foreign exchange. First, it levied prohibitive tariffs on the import of U.S.-made light aircraft. Then since it didn't have the technology to build its own planes, it invited an American manufacturer, Piper, to bring U.S. technology down there and produce with Brazilian workers. Brazil is now not only selling light aircraft to other Latin American

countries and Africa, displacing U.S. exports, but is planning to export planes to the U.S. It is typical of our government's trade policies that while Brazil has effectively banned imports of U.S. aircraft, Brazil can sell freely in our market.

There is nothing wrong with Brazil, or any other nation, looking after the needs of its own labor force. All I am suggesting is that it is time for the U.S. Government to do the same.

During the last few months we have witnessed the closing of obsolete steel mills in the United States, while at the same time steel mills using the latest technology are going into production throughout the developing world. Since these mills cannot possibly reach economical levels of capacity utilization based on LDC markets, inevitably they are going to add to the world's excess steel capacity seeking export markets at any price.

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Among the numerous products requiring high technological input being made throughout the lesser developed world are small aircraft in Brazil, computers in Romania, aircraft parts in Mexico, digital watches in Hong Kong, electronic products in Korea and steel in Venezuela. There are also modern shipyards in both Korea and Singapore. It is obvious from this that the priorities of the less developed countries of the world are to have prestige industries which are capital intensive and which do little to relieve the plight of the millions of unemployed and the poverty stricken.

As a result of the expansion of multinational corporations a small very rich elite has been created in most of the less developed countries and little has been done to help those that need it most. The trickle down theory has never worked in practice, and factory workers in the less developed world who have been earning at best subsistence level wages in many countries have not been able to obtain wage gains sufficient to keep up with inflation. In Hong Kong last year, multinational corporations in the electronics industry, including some which are American owned, fought legislation that would have guaranteed industrial workers six days vacation a year, in spite of the fact that wages are among the lowest in the world and working conditions are a disgrace. Given this attitude, there is little hope that workers, who in most of the less developed countries are denied the most basic trade union freedoms and rights, are the ones that would benefit from a further technological give away. At the same time, technology transfers deprive workers in the United States of job opportunities and create further insecurity among employed workers.

We in the labor movement do not believe that we are doing the poor nations and the poor people of the world any favors by following policies that are destructive of our own best interests. The economies as well as the security of

need thousands of small, locally-owned enterprises using intermediate technologies.

Advocates of unrestrained overseas investment, free trade and technology transfer contend that it doesn't matter if we lose our manufacturing base, because we can become a service economy living off returns from overseas investments. We in the labor movement, at least, know better. Who today can really believe that the rest of the world is going to permit a permanent one-way flow of profits and interest to U.S. corporations and banks? Remember the British Empire? But even if other countries refrain from nationalizing U.S. investments, whose investments are we talking about? Certainly not those of the working people who make up the vast majority of the population. No more than 4.4 percent of the population owns 60 percent of all corporation stock and almost all corporate bonds.

American trade unionists would like to see the workers in the less developed countries raise their standard of living to our level, but have no intention of seeing our standards lowered to theirs. We recognize that a free trade union is one of the prerequisites for sound economic and social advancement for those at the lower levels of society. We therefore view with alarm the one party systems and the military dictators of the less developed world who often deny their own citizens the most basic human rights and trade union freedoms. This makes us very doubtful that the transfer of industrial technology or any other give away program can have any real beneficial impact on the large numbers of poverty-stricken people in the less developed world. In most LDCs such technology transfers have only resulted in widening the gap between the rich and poor.

Another factor that has to be taken into consideration is that with a free flow of technology there would be no way to control the arms buildup in the less developed world, and we could end up by indirectly supplying the means of repressing those we are trying to assist.

In conclusion, I believe that the longer range goals of United States policy should be to relieve the misery of hunger and malnutrition among the poor in the less developed countries by supplying the kinds of technological know-how that can be easily applied to improve agricultural production. The latest technology in medicine and health care should also be made readily available.

Under no circumstances should any capital intensive technology be transferred more easily, and no technology that has been developed with the use of public funds should be transferred without the lead time that is necessary to keep us in the United States competitive. It is obvious that until now labor participation in the preparation of policy has been negligible, as there seems to be a tendency to ignore those who would be most affected by any changes made. If labor has any role at all in implementing a policy, it should be to screen any technological transfer that could adversely affect workers in the United States.

Senator STEVENSON. Thank you, Mr. Sharman. Your statement points up an important problem that has to be faced, the problem of jobs and economic growth.

Did I understand you to say that labor has not been involved in preparation for this Conference?

Mr. SHARMAN. Not to my knowledge. The only program I have been involved in myself is the Library of Congress seminar, but I am not aware of any other participation.

Senator STEVENSON. You are not aware of any other participation, but you can't state as a fact that there hasn't been any participation.

Mr. SHARMAN. Not that there hasn't been any, no, I can't.

Senator STEVENSON. Now, you apparently disagreed, Mr. Sharman, with the suggestions by others that technology transfers just cannot effectively be controlled.

I also chair the subcommittee of the Senate that has jurisdiction over export controls. We have done a lot of work on this subject. We try with some success to control technology transfers that have military or strategic implications, but it is pretty hard to control the flow of human bodies, ideas, pieces of paper.

Do you really think that it is possible——

Mr. SHARMAN. I don't think we can keep technology enclosed as such, but I think we can take advantage of the leadtime as we have been able to do in the past. By taking advantage of leadtime and creating production in the United States, it gives us a further chance of producing more improved technology, so that by the time the original technology is transferred, there will be something to take its place.

There is now, a shorter and shorter leadtime. The digital watches were an example. In no time at all they were being made in Hong Kong, Singapore, and everywhere else by American manufacturers and being imported in competition with watches being made in this country.

Another thing, and this doesn't particularly concern the developing countries, but in the aerospace industry, coproduction agreements are made and other countries admit, they are made solely for the purpose of gaining our technology.

The Japanese freely admit this and so do some of the European countries.

By technologies, I also mean know-how, because know-how is a part of it.

Senator STEVENSON. Well, let's assume for the sake of the argument that the truth of the abstract proposition that technology can be protectively closeted or at least for a time in order to afford you a chance to dominate a market, to get an edge on competition.

Do you think that if so, the Japanese would be justified in closeting their advanced technology for the production of steel, which they now license to U.S. Steel and to other American companies?

Mr. SHARMAN. I think the Japanese and others are far more careful about releasing their technologies than we are. I think this has been proven. Another thing that really concerns me——

Senator STEVENSON. I have seen it. You have been to a plant in Taiwan. I don't know where that technology in Taiwan came from. It could very well be that much of it, perhaps most, perhaps less than half of it, I don't know, didn't come from the United States.

It may have come from other countries. We may be as dependent on it as the Taiwanese are. I am citing a case of which I have personal knowledge concerning steel and Japanese technology. It is a two-way street. It may be in the case of steel and in the case of other products that other countries are developing technology, too, which has great value to us, and that the country and the company that wins out is not the one that closets its technology and invites the retaliation of other countries, but the country and the company that is most ingenious and comes up with the technology first, and then takes advantage of it first.

Mr. SHARMAN. That is right.

Senator STEVENSON. Perhaps that is the problem. We are not making the investment in technology that we once were, and others are catching up. When we do have products of our investment in R. & D. in hand, we don't use them.

I can cite some examples, such as superficial wing for aircraft developed by NASA, which finds its place on Soviet airframes before it

does in the United States. Whose fault is that? It is not the fault of the Soviets.

Maybe it is the fault of American manufacturers. Do you really think you can compartmentalize that technology or that it would be wise to encourage the Japanese to do so?

Mr. SHARMAN. Well, I didn't believe that our own companies have taken advantage of the leadtime. They can go to Taiwan at 50 cents an hour wages, use the latest in technology that has been produced here in part by the use of Government money, and bring their products back to the United States and make a great profit.

I think this is wrong and something has to be done about it.

Senator STEVENSON. You mentioned Zenith, too, which I know a little bit about because that corporation, which has suffered from foreign competition, is a corporate constituent of mine.

So is Quasar of Motorola. Quasar gets taken over by the Japanese, and they end up taking that failing corporation and producing television sets in the very same facilities that couldn't support the production of those television sets when it was under American manufacture. The point is that Americans are working in the Quasar plant today, and in Sony plants.

What is the matter in the case of Zenith? It is not dumping in that instance, is it? Is it a transfer of American technology to Sony that makes it a preferred and more expensive product than Zenith, or is it superior Japanese technology that we ought to be getting from them?

Do you know?

Well, I have my suspicions.

Mr. SHARMAN. I look at the Zenith company of another case of a whole industry going overseas, and as soon as the whole industry starts going overseas, there is less and less development done in this country, and we hand over the lead to the other countries.

In other words, we are giving it to them because of our policies.

Senator STEVENSON. My counsel just reminded me of an experience I had a few days ago in Illinois. You indicated, Mr. Sharman, earlier that you thought we ought to support production of agriculture commodities throughout the rest of the world.

However, my farmers aren't very enthusiastic about the suggestion that we be encouraging the production of palm oil or soybeans or other commodities abroad. Let me cite another example.

My State is the biggest producer of corn and soybeans. I went to a fair just a few days ago in Decatur, Ill. One of the largest companies in the business of processing corn and soybeans was producing high-fructose sweeteners. It is a very potent sweetener, whose production has developed a significant and entirely new market for corn.

I went to the R. & D. lab at this large plant in the middle of the corn belt and asked who developed the high-fructose sweetener? Did you in this lab develop it?

There was silence.

No. Who did?

They said it was the Japanese who developed the high-fructose sweetener for our corn in Illinois.

The Japanese don't grow any corn. Shouldn't we be able to use that technology the Japanese developed? Should they be encouraged or permitted to closet it?



Mr. SHARMAN. I don't think it is possible to closet technology. I do think it is possible now to maintain a leadtime and keep the manufacturing industries in the United States competitive. To the agriculture question, I have an answer.

I do quite a bit of traveling in the developing countries. I just got back from Africa. In talking with trade unionists, who are often better off in the society than the ordinary people, it is amazing to find what they live on in a week, the type of food that they have.

Even if we produced all the food for those countries they couldn't afford to buy it. They need to be taught how to grow their own food and how to increase their own yields.

Many of them are eating meat once a week. They are eating rice and boiled bananas or boiled plantain. I have gone to their homes for meals. I know what they are eating.

Certainly these types of conditions could be improved very easily.

Senator STEVENSON. I agree with that.

We are not talking about giveaways. I don't think anybody is suggesting that.

Senator SCHMITT?

Senator SCHMITT. Thank you, Mr. Chairman.

I thank the panel for their additional testimony on this question.

There are two areas I would like to pursue a little bit more. The first deals with the question of agreement with organized labor on what our problems are in the present international economic environment.

There has been a lack of capital investment in this country and you have described that very well in terms of being able to keep up in productivity or ahead in productivity of other countries with lower labor costs.

Up until the last decade, productivity has been really the thing that kept us ahead in addition to being able to support a rise in cost of labor. I am not arguing against a rise in cost of labor necessarily, so long as it matches productivity. But I think we have seen that trend change in the last 10 years. That has contributed to this outflow of industry.

The lack of research and development within the private sector as well as that financed by the Government has made it harder for us to develop products in which we would have an initial lead in a market.

I think organized labor tends to agree with the lack of capital investment and the lack of R. & D. in major programs.

At least I have talked to many of your colleagues who seem to agree with that.

Would you agree with those two?

Mr. CHAIRMAN. Yes; I agree this is part of the problem, but there is no sense in spending a lot on research and development if it is going to go overseas before we take advantage of it in the United States.

Senator SCHMITT. We have historically taken advantage of it rapidly once it is developed. If we are not developing it, we won't have that opportunity.

I am afraid that is part of the problem now. The question is, how much can you slow down the transfer of the talents of at least portions of the industrialized world since once they buy a television set they can probably duplicate it, if not improve upon it?

I am not sure what we can do except be willing, as the Chairman has suggested, to compete tooth and nail in an international market.

place as we have in the past competed tooth and nail within our own national marketplace.

We may be at that point, I am not absolutely convinced, but it may not be possible to slow down the rate of technology transfer of even intensive technology, or advanced technologies, to the point of where we have time to take the kind of advantage of it as we have been used to.

However, if we stay on the forefront of technology and keep pushing it, we will have an advantage just by being there.

Of course, our own internal economy and society has to be flexible enough to change. I think one of the biggest challenges we have is for labor and management both to be able to switch technologies, and even sometimes switch products very rapidly so we can take advantage of the next step while somebody else is manufacturing what we have already left behind.

I think we are in a new era, a very dynamic era in which the closet or the restriction of the transfer of technology is going to be just about impossible, particularly if you want to run an open society. If we want to close our society as the Soviets have closed theirs, then maybe we might be able to eliminate such problems. Personally, I don't think it is possible to close our society and I think it would be the wrong thing to do.

MR. SHARMAN. I'm afraid I agree with you on that. As I say, the most important thing to me is the leadtime. I think we do have some control and could have some control over the leadtime.

Another problem that worries me is that the AFL-CIO did a study at one time on technology that was being transferred to Japan and found that it was being transferred for the price of 1 cent to the dollar of what it cost us in the United States. I think this is something that should be looked into as well. If we are going to sell our technology, at least we should get the money back for our taxpayers in the United States.

SENATOR SCHMITT. I think we ought to certainly get a fair price, whatever happens. What I'm afraid of—I'm not necessarily afraid of it, but what I think is happening, we are in the transition time, between the time when the leadtime in technology meant something economically, to a time when there is essentially no leadtime. We have to find another way to live economically in this new environment.

When the Panama Canal was built, new industries, new technologies were opened up. For decades we maintained a major lead in those industries, as a consequence of that particular spurt of technological innovation. Today, in the space program, we developed computers and electronics and almost before we could blink an eye the rest of the world was building the same thing. With relatively little assistance from us, they just bought them, they got a hold of it and they started to build it. So I'm afraid historically things have changed.

The rate of change has accelerated. So we have to find a way, both labor, management and government, to maintain a competitive position in this world without lead time, if you will.

Would any of the other panel care to discuss that issue?

MR. WALLENDER. Let me just agree with one of your comments in terms of the question of access to technology. U.S. industry is one of the largest buyers of technology in the world at this moment.

Second, it is essential that we be able to acquire technology and certainly the fear of having a restricted market in technology is very important to us.

Second, and I think what is more important is the question of the technology transfer and impact on labor is a very serious question, but the issue we face with the group of 77 comes mainly from countries which we cannot participate under any fashion unless we in fact manufacture and carry out certain activities there.

It is not the Taiwan, South Korea situation which we are most heavily confronted with. It's societies in which Brazil, Mexico, most of Latin America, a great deal of emerging Africa, where we must in fact transfer some degree of assets and technology to participate at all. It's not an option of whether we export their or in fact manufacture. The only way we can participate is to be there.

What's more important to us, we feel that, now, yes, we do transfer technology in many cases to help build local industries, we are in fact transferring at that time American capability and systems which in fact creates the demand for greater American subcomponents, other American technology, et cetera.

For example, in a recent case we were investigating in Peru, it's of great concern to us that our German and French competitors are actively training with government assistance in Peru the use of German machinery, using French systems, and in fact are creating a new demand in Peru for a whole variety of European subcomponent systems, et cetera.

If we are not present, we cannot effect that demand. Under the system we are faced in, we won't be there unless we are able to transfer technology. The question of the movement of U.S. industry abroad has in very few instances been related to a labor factor. In fact, that is the greatest criticism of this third world, that we are not adapting our technology to labor factor advantage.

In almost all cases, in the Common Market, throughout Latin America, we have been forced to move there because of their national legislation. I feel the U.N. Conference provides us a unique opportunity to in fact identify and clarify some of the factors that Mr. Shorman and the panel are discussing.

What are the factors that in fact affect U.S. industry abroad? Why must we transfer technology and in what situation is it not in our interest? Clearly the international firm is caught between two competing factors.

One, the third world, which is demanding greater access to technology. And I don't believe that in fact that technology transfer will flow. I think our interest is to try and help them understand that as quickly as possible.

Second, the problem of conflicting technology is not a viable option as we see it, because we have, as you and others have noted, a very aggressive international market in which we are trying to compete. The technology flowing into Eastern Europe today is not flowing from the United States but from European firms. We wish to compete in that environment. We believe in free trade environment.

It's of great concern that we view not only developing in the developing world but restrictions in the United States. As I say, I think the exciting part of this U.N. Conference is a chance to involve not

only the private sector in terms of management but also labor. To that comment, I think Mr. Sharman might be interested in the wide variety of programs that have been encouraged by Ambassador Wilkowski's offers to in fact produce that kind of material. It's through the chance of interaction that we have a chance of understanding the myth and the reality.

Most of the companies have done development studies that have shown without the ability to transfer technology abroad or participate abroad they would lose jobs. There's great confusion in this area. It's certainly suitable such as conference as we are looking forward to in 1979 provide us with the opportunity to work together to sort out the myth from the reality.

Senator SCHMITT. Let me ask the three gentlemen who more or less represent business to address themselves to Mr. Sharman's points. One of his points related to the person that lost their job because scientists or somebody else modified the plant.

How do we develop flexibility in our economy, so even if it does occur, there is still a job, if not a better job, waiting for that person. Do we take care of this situation when the job loss is due to an international free trade situation? Often a whole community is hurt by it.

It's a legitimate question. When you look at the average statistics perhaps you don't see it, but for that community and for the congressman and senator affected by that community, it's a very real thing.

Mr. DUNN. Mr. Schmitt, you hit on one of the most difficult questions that face us in industry, and I believe that this has to be faced, perhaps the primary thing is we have of course a system of assistance which attempts to find jobs for workers in industries that are displaced.

I will submit, the system has probably not sufficiently evolved to be effective in all cases, but I think we can do very much more in this field. Of course, the other aspect of the question is, that we must maintain our productivity and our inventiveness. This has been brought up before. And if we cannot remain competitive, which has always been our major asset in dealing in the international economic field, then we are in real trouble.

But I'm convinced that we do have the ability, the initiative and the inventiveness to produce new fields, new technologies which would provide labor for our workers here in the United States. However, we must face the fact that there are some fields, particularly the less technologically oriented fields, where perhaps products can be produced better elsewhere. Where we have industries, I'm talking about textiles, leather products, et cetera, that is where the program of assistance would come in. I recognize that this doesn't satisfy the labor argument, but I see no other alternative, because we are dealing in a competitive world.

We must trade. We have a deficit in our balance of payments as it is now, and the world has been going through a recession. It has not come out of it as rapidly as we would want it to. Trade is a two-way street and other parts of the world must be developed to produce. I think of the experience of the last 20 or 30 years, where there was a great expansion in trade, which revealed that this is mutually beneficial to everyone.

So we must believe in the development of trade, and in order to do that there has to be a certain transfer of technology. I think Mr. Sharman was talking about in the transfer of technology, of mostly hardware, of mostly hardware and high technology hardware, and that is just a very small part of what we are talking about.

We are talking about knowledge that has—that can be transferred, how to manage an enterprise and how—various what we call software aspects of the transfer of technology. I don't believe that that sort of transfer leads to immediate loss of jobs in the United States. I don't know if that answers your question. It's just some observations that I have.

Senator SCHMITT. I think it is very helpful. I think we all realize that we must minimize the numbers of workers that are adversely impacted in a free trade environment. One way to minimize that is to always have a positive balance of technology transfer, if you will, and a very large positive balance of technology transfer.

Right now I would say we still have a positive balance, but it is not nearly where it ought to be and that is largely again because of the nature of our capital environment over the last 10 years or so.

Investments just haven't been made either by private industry or by the government in the cutting edge technology areas.

That is a very broad spectrum of activity. It ranges right across the board.

It could even affect the shoe and textile industry, if we were aggressively trying to advance the manufacturing technology within those areas. We haven't been trying to do that.

Mr. WALLENDER. There is another kind of technology which is being developed as a result of this technology dialogue. It may be of help for this problem.

One of our biggest problems is the ability to change; the ability to organize ourselves in a fashion that we can respond to these kind of changing environments. One of the exciting things about the technology transfer crisis, which is facing our firms, is that they are beginning to explore a certain kind of management technology; internal managerial technology that deals with three things.

First, how to capacitate human beings, that is, how to train them, and finding the ability or mechanism to move a man from one job to another area as quickly as possible.

This is the key to the overseas activity. It is also the key to the internal problem.

Second, we have a problem of rigidities within the firm. Because of specialization of labor and because of specialization of certain interest groups, we face a number of internal barriers that do not allow us to, in fact, move a transition from one kind of organizational format to another.

I think one of the things we might consider when we talk about technology is not only the investment we have to make in creating technology—the leading edge, hard science technology—but the internal technology. Much of the Third World is now beginning to understand, that it is not the specialized manufacturing process they want, but rather the ability to manage technology. One of our problems that we face is learning how to transfer skills abroad. I think that we should be investing greater resources internally in terms of how to deal

with the problem of moving and changing our own personnel as well as building skills in the Third World.

That is the kind of managerial science, which is often overlooked in a simplistic view of transfer of technology. It seems to me that this is one area where we might encourage. We are seeing within industry a great deal of concern, of developing the internal capability. I merely cite the example, that few of our companies, in fact, have developed a full understanding of how experience is developed, how know-how is transferred and are having to study this so that they can compete. I think that this kind of experience turned inward will also help when we find the kind of unemployment situations. These are human resources that we are having to lose. It is important not to lose these resources if we can find how to transfer know-how to them.

I would hope that in the future, when we consider the discussion of science and technology, we won't overlook the internal managerial area which with greater focus and attention might not only help us compete better overseas, but at the same time deal with the internal displacement that results from an inability to compete.

Senator STEVENSON. Mr. Finnegan?

Mr. FINNEGAN. Just a few comments, Senator Schmitt. I think one thing that would help, which has been alluded to in this morning's testimony, is for the United States to get back into devoting more of its resources to research and development.

I think when sputnik went up in 1957, it was a great shock to the United States that the Soviet Union could be that far ahead of us in space technology. It was a good stimulus toward education in science and technology and a big stimulus to additional expenditure of research and development funds; and the Government certainly helped by the creation and disbursement of those funds.

We hear the statement in education that we have to get back to basics, and we see that scholastic aptitude scores have fallen off over the last 10 years or so.

I think part of it, just as you stated, is that we are getting into a more hard, open, competitive world today—perhaps a new era. And the United States, I think, is going to have to—and the Government perhaps in particular—start thinking about ways to create and spend R. & D. funds more effectively and to encourage capital investment by its own industry.

You asked earlier, "What do you do about the individual worker when the Zenith plant closes?" I certainly would not presume to have any answers to that question. Senator Stevenson mentioned that the Motorola television manufacturing operation was in difficult shape and was sold to the Japanese. Now the Japanese have been successful in turning it around and making it profitable.

Maybe the Japanese have been studying some of the things Mr. Wallender was talking about, about internal organization.

We also see that there is encouragement for Japanese companies to conduct manufacturing operations in the United States, rather than just manufacturing in Japan and importing into the United States.

Sony has started a plant in the United States, and other Japanese companies have plans to do the same thing. That kind of activity is certainly going to help the American worker.

I don't know if it helps the United States develop its leading edge on technology. Probably not.

Perhaps some of the other things, like more emphasis on research and development, are needed for that.

I strongly believe leadership from the Government would be helpful in this area.

Senator SCHMITT. Mr. Sharman, do you have any comments?

MR. SHARMAN. Just to comment on adjustment assistance, I think you know what we think of that in the labor movement. We term it burial insurance or as IAM President Winpisinger says, it is the biggest fraud ever invoked on the American worker. That is what we think of it. We want jobs, not handouts.

We want the means to get those jobs. One of the problems as we see it is that our companies, because of our trade laws, are encouraged to operate overseas, rather than invest in the United States.

I think the tax laws and the trade laws should be changed so it is just as advantageous for them to invest in the United States as it is in Mexico, Taiwan, or somewhere else.

Senator SCHMITT. Gentlemen, this has been very interesting. One of the things that has come out of this discussion, in my mind, is that we really have to watch that we don't talk about apples, oranges, bananas, and pomegranates, and say they are all the same kind of fruit. We have, because of Mr. Sharman's discussion here, talked a great deal in this session about the leading edge consumer-oriented technology. Industries that employ significant numbers of people, but also manufacture vast numbers of products have tended to move to Taiwan and Japan in greater numbers in the last decade than in the past. That is probably the place where labor has been hurt most, in that kind of movement of consumer-oriented, but still leading-edge, technology.

There are also other leading-edge technology industries that have been mentioned; technology, development of transportation systems, and so forth.

That is what I believe Mr. Wallender was referring to primarily in some of this remarks. We have to get out there and compete or somebody else will do it for us.

The manufacture and sale of locomotives and things like that can very definitely help labor, because we are talking about the manufacture of those components in this country and assembly and construction in another place.

Mr. Sharman is particularly interested in the antipoverty technology. That relates more to the discussions this morning; the kind of things Father Hesburgh was referring to, where we have the opportunity, because we know how to do things now that we didn't know how to do 10 years ago or 100 years ago, in terms of poverty, hunger and disease, and so forth.

That technology transfer, I am sure we all feel, is something we should be trying to do.

It doesn't have to be at the expense of American agriculture either, I don't believe.

I think it can be done not at the expense of American agriculture and may actually enhance the markets for our own specialty agricultural products.

There is managerial technology. I think that was an excellent thing to point out. It is another type of thing that teaches people to

manage their own affairs, manage their own internal society in ways better. But let's face it, we are not perfect in that area either, and you pointed that out.

Then, as we talked about this morning, there are some benefits of high technology which are marketable.

Communications, satellites, Earth resources, and so forth, are not direct transfers of technology. It is a transfer of an intangible benefit because there is a break in the transfer chain.

So I am sure there are others, but those five seem to come down as the major ones in which I hope that we can now start to try to separate and see how the U.N. conference should deal with each one of them.

If the panel has any further comments, just raise your hands.

If not, I wish to thank you for your expert testimony and for the assistance you have given to this subcommittee in increasing our knowledge about the total scope of the problem.

Thank you very much.

Senator STEVENSON. The next panel is from the academic and non-governmental organization areas.

If they would come forward.

**STATEMENTS OF WILLIAM D. CAREY, EXECUTIVE OFFICER, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE; RODNEY NICHOLS, VICE PRESIDENT, THE ROCKEFELLER UNIVERSITY; ROBERT STEIN, DIRECTOR, NORTH AMERICAN OFFICE, INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT; AND WILLIAM N. ELLIS, COORDINATOR, TRANSNATIONAL NETWORK FOR APPROPRIATE/ALTERNATIVE TECHNOLOGIES—TRANET**

Senator SCHMITT. We might as well proceed in the order available to me on the witness list unless somebody has some other suggestions.

Mr. Carey?

Mr. CAREY. Thank you, Senator.

I am glad to see the interest that this subcommittee is taking in the preparations for the approaching U.N. Conference. That Conference is to be more than a general exchange of scientific courtesies and a listing of blue-sky aspirations. It will be a faceoff between advanced and deprived countries, in a charged atmosphere, with science and technology as hard currencies in the new diplomacy. This is the logical outcome of postwar western achievement in discovery and application of knowledge to social, industrial and security goals, and the lessons have not gone unnoticed.

The issues that are now being raised go to the rate, the terms, and the scale on which this productive knowledge is to be shared in by the have-not majority. It so happens that these questions are enmeshed in dilemmas of our own national economy, our markets, and our legal and institutional structures. In approaching the questions we need to recognize this complexity. Science and technology are new and important arms of foreign policy, but they are equally important to policies for the growth and stability of our national economy. This double image of science and technology must be kept in mind and re-



spected as we prepare for the U.N. Conference, and it defines implicit constraints on the posture that we adopt.

Once we recognize this overlap of policy management affecting both our diplomacy and our domestic economic affairs, we come down to earth and to realities. The first is that stimulation of development through science and technology is not going to come about through a quick and massive transfusion. It will take decades. If I am right, it follows that any significant U.S. response to the "new international economic order," and specifically to industrialization, will require a solid and continuing U.S. political consensus. Without that, the going will be uneven and contentious.

Such a political consensus will have to depend on more than diplomatic rhetoric, and it is very unlikely to materialize at all in the absence of an expanding domestic economy capable of lively innovation and growth. A struggling U.S. economy, lagging in productivity, adverse to industrial risk investment, shying off from long-term research and development, beaten repeatedly by foreign competitors, and unable to keep its workforce employed, is not likely to provide or sustain a political consensus to underwrite decades of scientific and technological support to development—especially if the aim of the Group of '77 is to reduce and eventually erase the relative economic differentials between North and South, which would mean an absolute reduction in the western standard of living. A U.S. consensus for that sort of goal will be hard to build. If we go into the 1979 Conference unaware of these realities and without congressional and administration agreement on measures to reverse the slow-growth and low-innovation syndrome with which we are now afflicted, we will go there in bad shape. But if we can anticipate an expanding national economy capable of absorbing and affording the near and midrange economic and other costs of industrialization assistance to the developing countries, a moderate political consensus has better prospects, and the diplomatic options and initiatives which we can lay out in international forums will be less limited. So, Mr. Chairman, I view the matter of an expanding U.S. economy, with accelerated innovation, as fundamental to our diplomatic posture vis-a-vis the developing nations.

There is a basic political goal for a diplomatic initiative through science and technology, and it is a stabilizing objective—an aim to defuse rising hostility and resentment and to find terms on which to reduce dependency. The problem is to get a handle on that objective. I think there is little to be said for blindly transplanting industrial technology and hoping that it will seed rapid development. At the other extreme, the advanced nations can espouse such fundamentals as nurturing indigenous scientific education and training in order to build a foundation for self-help. That is an important but time-consuming business, and perhaps insufficient all by itself. Appropriate technology or, more diplomatically, intermediate technology has a strong case going for it, but as a diplomatic response it suffers from the concession that sticks to it. I will not pretend to write the prescription, but I can't rid myself of the belief that development comes from combinations of capital, management, markets, labor skill, risk incentive, and literacy. Science and technology are only partial contributors to development; they are not independent of other fac-

tors and capabilities in achieving a developed economy. They are additive, with the qualification that scientific and technological opportunities will often exert a pull on education, skill training, and capital investment.

What this suggests is a two-track approach, starting with educational investment and institution building for science and engineering, and then scaling plans for industrialization to the growing human and capital resources. Certainly the advanced economies can supply education and training, including managerial experience and decisionmaking skills. They can link their scientific and technical societies with those of developing countries, and provide crossflows of nonproprietary knowledge. They can help to design and organize advanced scientific and technical institutes of the National Bureau of Standards type to serve a consortium of developing countries and to provide career opportunities for graduates of their universities. They can help by designing and adapting technology diffusion systems comparable to the agricultural county agent model. All of these things come within the definition of capacity building, and I think we should get on with it.

We come to the question of applications of science and technology for development, I think we should first attend to basic human needs. Here is where we find the worst contrasts between North and South, and the fatal limiting conditions under development. Nutritional deficiency, high mortality, unsafe water, insufficient food, poor housing, overpopulation, shortages of doctors and health personnel, poorly equipped schools, a lack of work opportunities and incomes—all these basic human needs exist and they should be the first priorities to be addressed through scientific and technical cooperation with the developing countries. I think that the political consensus is present in the United States to focus scientific research and applications on this agenda. But it is not at all clear that the developing countries see things this way, nor that their choice of technology would be oriented to basic human needs.

Moreover, when we talk about transferring scientific and technical knowledge and practices to developing countries, we need to think about the process for getting it there, and about the impact that it is likely to have on the recipient societies. In the first place, what are the financial terms on which the advanced countries would transfer technology to the LDC's? To the extent that loans and credits would be involved in getting proprietary technology into their hands, we need to look at the capacity of particular countries to carry and service additional external debt. The more debt we pile on, in the name of development assistance, the deeper may be the hole into which we put these economies. This is a mixed question, because the developing economies are in varying states of both advancement and manageable debt burden. The answer may be different as between the poorest countries and those that are in the midrange of development. Moreover, as a Brookings Institution paper points out, a considerable portion of LDC foreign debt is to the OPEC countries, rather than to us. Even so, I look at that same study and see a figure of \$140 billion representing the total external debt of nonoil developing countries for 1976 and I do not feel easy with it.

One of the purposes of scientific and technological assistance should, I think, be to create export potential through which the developing countries can work off their existing external debt. I leave it at that, Mr. Chairman, my point being that our posture in preparing for the conference should include the results of some serious homework on the financing strategies for transferring technology.

The benefits of science and technology to the developing nations can be very substantial, provided that it is done well and with guiding priorities and criteria. If the goal is to make a difference, it is just as important to be concerned with the quality of the difference. This is particularly true for transfers of technology, because its consequences can't be taken for granted as beneficial. There were good reasons why the Congress provided itself with an Office of Technology Assessment, and we should be equally thoughtful about the risks and benefits of handing off technology to the developing countries. The priorities should be determined by the receiving nation, within long-term plans both for meeting basic human needs and for industrialization which is not simply imitative but builds on whatever natural advantage is present and awaiting development. The flow of technology, including managerial and marketing know-how, from North to South should be focused within these priorities. There are other criteria as well: The technology to be transferred should be environmentally sound, energy efficient, and stimulative of job creation, rising personal incomes and exports.

We have learned, rather late, that high-powered industrial economies generate high social costs along with growing GNP. As we survey the developing countries, we see for the most part rural-based societies and village systems. But we know that industrialization is a centralizing and urbanizing force, and unchecked it can wreak violent changes upon unprepared cultures and value systems. Part of the responsibility of the advanced and developing countries is to anticipate these side effects of technological modernization and to plan together for balanced change and development which does not tear traditional cultures to pieces, with all the familiar downside effects of uncontrolled rural-to-urban migration, urban poverty, violence, inflation and political instability. This is the dark side of mindless industrialization, and it is as potentially incendiary over the long run as the existing dissatisfactions that we want to defuse through a sharing of Western affluence. So far as we can, we should try to help through developing renewable energy sources which are basically decentralizing and at the same time reduce dependency on imported energy.

So, Mr. Chairman, it will be a complicated business to find sound approaches to focusing science and technology upon development. These are important forces for change, as we now know, and a new kind of informed diplomacy is needed to deal with them wisely. I started by saying that a commitment to an expanding U.S. economy is the necessary precondition to any significant scientific and technological initiative for development, and I reiterate that position. We can expect to be pressed hard by the developing nations. Our response by no means should be defensive or negative, but should recognize both the legitimacy of the issue and the large and troubling problems we ourselves must face in deciding how far and how fast to respond.

SENATOR STEVENSON. Thank you.

Mr. Nichols.

Mr NICHOLS. Thank you. It's a pleasure to be here today, and I join my colleagues in saying we are glad the committee is taking an early interest in this subject.

I would like to read a few highlights, just a few highlights of my prepared statement, and then add a couple of points I'm stimulated to make as a result of listening to the testimony during the last hour or so.

The issues that governments will confront at the U.N. Conference are going to remain on the global agenda for decades. In fact, the enormous array of complex issues will continue to resist any attempt at tidy packaging into simple categories.

One of the causes of complexity is that this subject touches deep political and economic conflicts which may worsen in the period before the Conference. These conflicts stem from ideological differences, competition for resources, sluggish economies and high unemployment throughout the world, and the sharply rising expectations in various countries about standards of living. These conflicts, as you have seen, arise at home as well as abroad.

Another reason that planning for the Conference is complicated is because science and technology permeate so many human activities. As a result, the Conference correctly attempts to integrate science and technology with the entire spectrum of goals, policies, and actions for social and economic change throughout the world. That's no mean trick.

Since knowledge is still a source of power in the world—not the only source of power, but a major source—the United States could have substantial influence on the outcome of the Conference, if the diplomatic circumstances turn out to be favorable. But to be effective, the United States must settle on clear goals for a strategy of cooperation along new lines.

Senator Stevenson, in his invitation, posed several questions. Now I would like to comment briefly on each of them.

I think it's worth reminding ourselves first that the Conference's preparatory process aims for a realistic assessment by each country of its particular priorities for applying science and technology. This is the so-called national paper process. It's clear in the United Nations guidelines that the industrialized nations are obligated to focus mainly on the needs of the LDC's.

Second, the Conference's guidelines for preparation also encourage an effort to reach for greater coherence in linking national and international policies. With greater coherence in policies, we assume it might be possible to achieve greater efficiency in carrying out programs of assistance and cooperation.

One of the main difficulties of the national paper process is that each country views its circumstances in an individualized style. Indeed the monolithic term "Third World" masks such enormous differences in resources and achievements that the United States must design a much more differentiated set of programs. My colleague Frederick Seitz and I, along with others, have been involved in a detailed set of studies of the scientific and technological trends in Iran and in the People's Republic of China. This work together with other studies that several of us have done in countries such as Taiwan and Brazil,

convince us that the United States has new opportunities to learn and new opportunities to collaborate in new ways, particularly with the middle-income countries.

I should add a point that most of my friends who are development economists would certainly emphasize: the United States today has no monopoly on expertise about development strategies. Gone are the days, if they ever existed in the forties and fifties, when the United States could in some sense be regarded as the intellectual center for how to plan the development process. Clearly in the last decade, the third world has produced its own sophisticated analysts in this area.

I also must say that, speaking as scientists who prefer to put numbers on ideas wherever possible, we see a need to create new systems for measuring the scale and intensity of development problems, so it would be feasible to determine how much progress is being made. For example, most observers have been using an economic index of either the prosperity of a country or its rate of growth. While economic growth is essential, it's usually not sufficient in the short run to change the lives of most of the population. In many developing countries we know that the upper 20 percent of the population may receive 50 percent of the national income, while the lowest 20 percent may receive only 5 percent of the national income. But we also realize that these kinds of measures of per capita income do not reveal the whole picture. New concepts, such as the Physical Quality of Life Index being explored by the Overseas Development Council, must be developed so that legislators and administrators here and abroad can analyze priorities and results with greater confidence than any of us now has.

I would like to say a word or two, since you asked our panel to comment on this, about how we would assess the preparatory efforts so far being carried out by the executive branch. The decision to hold the U.N. Conference had been planned for several years, but it was really firmly made about a year ago, as the Ford administration was leaving office. The new Carter administration faced this item with many others during its transition in early 1977. The State Department moved reasonably quickly to appoint a full-time coordinator for U.S. preparations. Ambassador Jean Wilkowski assumed her position last summer. Given this late start, it's understandable that most of the work remains to be done. There's barely enough time, 18 months, to accomplish the task. We think that Ambassador Wilkowski and her small dedicated staff has been proceeding very well in this area.

I would like to single out three issues that in our judgment merit more attention by the executive branch and Congress in the next year and a half.

First, it's very clear that economic issues loom large. I would like to underscore that they loom large in both North-South and East-West terms. Technological competition and trade and cooperation are moving in all geographical directions. It would be unwise for us to "delink" our thinking about technology into exclusively North-South terms. For example, most developing countries and some countries of the so-called Second World have asked for special assistance in transferring technology for industrialization. When we render such help, if we decide to do so, we should understand the ways in which any cooperation may affect our national aims in future patterns of world trade.

A second point that I think merits much more attention in Washington than it has gotten in recent years, is that internationally oriented research and development should be restored as a respectable and necessary component of each Federal mission agency's work. Inter-agency policies will have to be coordinated as the United States attempts to relate its science and technology to the needs of LDC's—and as I was arguing a moment ago, to what we do in the East-West dimension. Yet there are decaying international programs in virtually every agency and there are weak mechanisms for coordinating any international R. & D.

Third, institutional innovations of several kinds should be fostered. The most recent major innovation in this area, I believe, is the proposal for an International Development Foundation. The concept appears under that name in a recent Brookings study. But it has been discussed for about 5 or 6 years under slightly different names as a result of studies by the National Academy of Sciences. This notion might have great potential for creating more effective methods of achieving excellence in our technical goals abroad. In short, it would be an independent R. & D. unit complementing the larger programs for aid. I believe Congress should assess the merits of these kinds of innovations from a long-range viewpoint.

I would like to return for a moment to the question of appropriate technology which has been raised several times and simply comment that one problem which besets all discussions in this area is the tyranny of the overuse of buzz-phrases, such as "appropriate technology," "basic human needs," and "technology transfer." Perhaps the most contested buzz-phrase of all is the "new international economic order." Each of these phrases has been invented to serve either a diplomatic purpose by those who hope to gain negotiating advantages or a journalistic purpose among specialists who use them as a kind of acronym to cover much more complicated concepts. I believe, that one consequence that may arise from speaking about appropriate technology is that whoever uses the term may be perceived as patronizing with respect to less developed countries. The term implies less than the best techniques.

The critical goal, of course, in the developing world is to create, as my longtime friend Bill Carey points out, a meaningful capacity to make effective choices in applying the many sciences and technologies and industrial options that are available. Many countries are building these abilities today, but there is of course no magical array of "appropriate technologies" that can guarantee success overnight.

I would like to conclude these highlights from my prepared testimony by commenting briefly on my perception of the general public reactions about the U.N. Conference. In talking with the colleagues in industrial and academic institutions throughout the United States, I usually sense an ambivalence. One first reaction is a feeling of good will that reflects the reservoir of American humanitarianism and the idea we can solve problems whatever they may be.

A second reaction, also an instant reaction, is skepticism—deep skepticism often. There are negative feelings about the demands of the Group of 77 and, frankly, about the comparatively limited accomplishments of past U.N. Conferences. Even fairly well-informed leaders in the scientific, engineering, medical, and industrial communities simply

don't understand the crucial, long-term strategic issues at stake. In this connection, I was impressed a few months ago by reading proceedings of a Congressional seminar last May at which former CIA Director Colby, who probably cannot be accused of being a bleeding heart, made cogent comments about the long-term strategic threat to the country. I won't read the whole paragraph which is in my written testimony, but it's clear that former CIA Director Colby is quite conscious of a combination of military and socioeconomic threats. He takes the larger panorama seriously, looking out 25 years.

Now, I would like to add three extemporaneous comments. First, at the risk of being presumptuous, I would like to draw the attention of the committee and staff to the very detailed guidelines for what the United States is supposed to be doing in preparing for this Conference. I don't take particular pride in these guidelines, even though I participated in the negotiations that led to this tortured text. But there are quite specific and pregnant requests for U.S. answers to certain questions in these guidelines.

One question, for example, concerns quantitative targets that might be established for spending on research and development related to the problems of less developed countries. A second specific question is for a detailed analysis of what we believe has been the pattern of relative success or failure of all past policies and actions in international development assistance. That's no trivial request.

A third question to which I would draw your attention, because I think it's of general interest to the Congress, is a request to comment on the effectiveness of the United Nations system itself. This includes particular reference, of course, to the technically oriented organization such as FAO, WHO, and the World Meteorological Organization. This conference provides the U.S. Government, and the United States generally, an opportunity to comment on how we think the U.N. system itself can be improved in coordination, integration, and overall effectiveness. In part because the U.N. system spends a lot of money, there are many people in this country who are not happy about the effectiveness with which that money is spent.

The second of my three extemporaneous concluding points is to agree wholeheartedly with you and others, Senator, who were saying earlier this afternoon that we have to replenish our own base of technological strengths. I agree we should favor free trade and open competition. Thus we cannot put a veil over our technology, except in very carefully defined cases. Some selective controls may be needed. But it seems to me that one of our robust answers to the less developed countries is to show that we intend to make better access at home and abroad of existing technology, while we are simultaneously replenishing our base for leadership. That domestic priority is an issue we don't need to go to the U.N. for. That is a problem for policy analysis and budget making at home about R. & D.

Finally, I would like to pick up on Mr. Carey's remark about "basic human needs." That phrase has in the last year come to mean to many spokesmen in less developed countries, a kind of "welfare" development strategy, and as such I think it is being increasingly rejected by them. In a sense the issue is comparable, although I don't mean this to be a pernicious analog, to the labor spokesman's eloquent comments that members of the labor constituency want jobs, not hand-

outs. That's exactly the position of the Group of 77. To the extent that a basic human needs strategy is defined as filling up a rice bowl twice a day, that's precisely what the Group of 77 does not want. Thank you.  
[The statement follows:]

STATEMENT OF FREDERICK SEITZ, PRESIDENT, THE ROCKEFELLER UNIVERSITY AND  
RODNEY W. NICHOLS, VICE PRESIDENT

Mr. Chairman and members of the committee, we welcome your invitation to testify at these hearings on preparations by the United States for the United Nations Conference on Science and Technology for Development. The Committee's interest in this subject will be very constructive.

The challenging issues that governments will confront at the UN Conference will remain on the global agenda for decades. Although some of these issues may be viewed in new ways over the coming years, the complex interactions with development of science, technology, and an enormous array of related educational efforts will continue to resist any attempt at tidy packaging into simple categories. In our testimony we shall assume that the Committee has already received considerable background on this subject.

One of the causes of complexity is that this subject touches deep political and economic conflicts, which may worsen during the period before the Conference. These conflicts stem from ideological differences, competition for resources, sluggish economies throughout the world, and the sharply rising expectations in various countries about standards of living.

Another reason that planning for the Conference is complicated is because science and technology permeate so many human activities. As a result, the Conference correctly attempts to integrate science and technology with the entire spectrum of goals, policies, and actions for social and economic change throughout the world.

Since knowledge still is a source of power, the U.S. could have substantial influence on the outcome of the Conference, if the diplomatic circumstances turn out to be favorable. To be effective, the U.S. must settle on clear goals and must understand the goals of others in a cooperative spirit—and that is what we have come to discuss today.

Before commenting briefly on each of the four questions posed by Senator Stevenson in his invitation to participate in these hearings, we should add a biographical note. Each of us has been involved in industrial, governmental, and academic activities with the scientific community here and abroad. For the past five years, we have served on the United States delegation to the United Nations Committee on Science and Technology for Development, the group which conceived plans for the 1979 Conference. Recently, we have been serving as advisors to the State Department and to the Office of Science and Technology Policy on some of the matters being discussed today. As members of the new private Council on Science and Technology for Development, we also have corresponded with Dr. Frank Press about this subject. More complete biographical data is available with the Committee's staff. Now let us turn to the Chairman's broad questions.

*What should be the immediate and longer range goals of the Conference?*

The immediate goals of the Conference might be grouped into three areas. First, as you know, the Conference's preparatory process aims for a realistic assessment by each country of its particular priorities for applying science and technology. The industrialized nations are obligated to focus mainly on the needs of the LDC's.

Second, the Conference's preparations also encourage an effort to reach greater coherence linking the national and international policies in this field. With greater coherence in policies, it might be possible to achieve greater efficiency in carrying out programs for technical assistance and cooperation.

Third, the Conference will emphasize both policy issues and process issues. The meetings in 1979 should be concerned with both why and how things should be done; with priorities for action that take account of historical experience as well as future opportunities; with selected case-studies and highlights of world-wide trends that may be helpful for planning at the international, national, and local levels.

Longer range goals of the national participants must emphasize building the institutions that will enable each country to achieve its purposes. By "building



institutions," we mean the entire complex of scientific, medical, engineering, managerial, and educational activities that form the base for social and economic development.

In all of these activities, countries ought to be concerned with giving a high priority to the poor and particularly to those who are at the desperate edge of starvation and death. But each country views its circumstances in an individualized style. Indeed, the monolithic term "Third World" masks such enormous differences in resources and achievements that the U.S. must design a much more differentiated set of programs. We have recently been involved in fairly detailed studies of the trends within the scientific and technological communities in Iran and in the People's Republic of China. This work together with some continuing familiarity with the directions of comparable efforts in Taiwan, Brazil, and other countries have convinced us that the U.S. has new opportunities to learn and collaborate in new ways, particularly with the middle-income countries.

We favor an approach that fosters self-sustaining general economic growth. A measure of redistribution of income may be required, but individual and industrial incentives ought to be preserved. Foreign aid in the form of money could never be large enough to meet all needs of the developing countries; in fact, only about 20% of the total funding for development projects comes now from external sources. We advocate a pluralistic approach in which technical cooperation on many fronts will enable developing countries to establish their own capabilities for applying science and technology to their development—an approach that has been particularly successful in a developing nation such as Taiwan.

*What should be the role of the scientific, academic and nonindustrial private sectors in achieving these goals?*

The general role should be to make a thoroughly professional assessment of the wide range of issues suggested by the Conference's theme. For example, we have recently proposed that there should be a "global assessment" that could serve as a technical centerpiece for the Conference. Such an assessment would aim to integrate the technology-related results of past UN Conferences held during the 1970s, as well as a number of other important recent worldwide studies on such topics as food, natural resources, energy, environment, urbanization, and communications.

Individual scientists and professional groups from the United States and all countries ought to participate in at least four years: (a) the preparation of the national papers in their home countries; (b) consultations through and for the UN Secretariat on special topics; (c) work on special problem-oriented studies related to each discipline, such as unconventional energy sources; and (d) a variety of what might be called cross-cutting studies regarding problems such as education and manpower development, the techniques for information exchange on both a formal and informal basis, and the crucially disabling gaps in middle-level R&D managerial skills throughout the developing countries.

We must add here in passing that, speaking as scientists who prefer to put numbers on ideas, there is a need to create new systems for measuring the scale and intensity of "development problems" so that it would be feasible to determine how much progress is being made. For example, most observers use an economic index of either the prosperity of a country or the rate of growth. While economic growth is essential, it is usually not sufficient in the short run to change the lives of most of the population. In many developing countries the upper 20 percent of the population receives 50 percent of the national income while the lowest 20 percent receives 5 percent. But we also know that measures of per capita income do not reveal the whole picture. New concepts—such as the Physical Quality of Life Index being explored by the Overseas Development Council—must be developed so that legislators and administrators can analyze priorities and results with greater confidence.

*How would you assess the preparatory efforts currently underway by the various life branches?*

As you know, Mr. Chairman, the firm decision to hold the UN Conference was made about a year ago as the Ford administration was leaving office. Thus the new Carter administration faced this matter during its transition period in early 1977. The State Department moved reasonably quickly to appoint a full-time coordinator for the U.S. preparations, Ambassador Jean Wilkowski, who assumed her present responsibilities last summer. Given this comparatively late

start, it is understandable that most of the preparatory work remains to be done. But there is barely enough time—eighteen months—to accomplish the task.

Ambassador Wilkowski and her small, dedicated staff have been proceeding vigorously and intelligently to consult all individuals and groups interested in the preparatory activities. During the past few months, despite the comparative shortage of professionals who have specialized in the links between science and technology on the one hand and foreign policy on the other, an admirable start has been made.

We single out three topics that merit particular attention during the next year by both the executive branch and the congress.

First, the economic issues must be reviewed carefully in both North-South and East-West terms. For example, most developing countries—and some in the “Second World”—have asked for special assistance in transferring technologies for industrialization. In rendering such help as industrialization broadens, we must think through the ways in which cooperation in science and technology may affect our aims in future patterns of world trade.

Second, internationally oriented research and development should be restored as a respectable and necessary component of each Federal mission-agency's work. Inter-agency policies will have to be coordinated as the US attempts to relate its science and technology to the needs of LDC's. At the moment, there is weak inter-agency coordination on most of the subjects on the Conference's agenda.

Third, institutional innovations should be fostered. For example, the proposed International Development Foundation shows great potential for creating more effective methods of achieving excellence in technical cooperation. It would be an independent R&D unit complementing the programs for outright grants and other forms of aid. We believe congress should assess the merits of such innovations from a long-range viewpoint.

*How important is the concept of transferring “appropriate technology” to the developing countries? How can professional and nongovernmental organizations contribute to this effort?*

The explanations of “appropriate technologies” are crucial—because, in many cases, technology transplanted with the best intentions was rejected or used inefficiently. However, the identification of such approaches should not trigger substantial controversy since no responsible party advocates the transfer of inappropriate technology.

Indeed, Mr. Chairman, one problem which besets this entire field is the tyranny associated with the over-use of fashionable buzz-phrases such as Appropriate Technology, Basic Human Needs, Technology Transfer, and the New International Economic Order. Each of these phrases has been invented to serve either a diplomatic purpose by those who hope to gain negotiating advantages, or a journalistic purpose among specialists who use such terms as the equivalent of acronyms to cover much more complicated concepts. One consequence, for example, that may arise from speaking about “appropriate technology” is that the speaker may be perceived as a patronizing or elitist individual who expects the LDC's to receive second-best techniques, whereas the opposite is usually intended.

As might be expected and as we mentioned earlier, the critical goal in most of the developing world is to create a meaningful capacity to make effective choices in applying the many sciences, technologies and industrial options that are available for pursuing the varied paths toward development. Many countries have built such a capacity and have succeeded in this process. But of course there is no magical array of “appropriate technologies” that can guarantee success overnight through a simple formula.

Let us attempt to be precise in distinguishing among various objectives for absorbing and adapting technical skills. Here are a few illustrations.

The many channels for access to the great sources of public information on technology ought to be examined and strengthened selectively.

Traditional ideas about utilization of “know-how” and “show-how” must be reevaluated.

The roles of both U.S.-based and foreign-based multinational corporations ought to be reappraised dispassionately. Intelligent accommodations—to reconcile the differences between governmental and corporate goals—may make it possible for the U.S.-based multinationals to function and at the same time strengthen cooperatively the managerial and technical capacities of the LDC's.

The means for providing U.S. technical cooperation on a long-term basis, as opposed to the narrower policy of providing short-term "technical assistance," ought to be explored fully. This process must include a search for and creation of the appropriate bilateral, multilateral, or international institutions.

We need to deepen our understanding of the reasons for the successes and failures of past projects, in the hope of finding some unifying principles which can be institutionalized.

We need increasing resources and greater administrative flexibility in launching desirable experimental projects—in technical areas such as population control and in general-purpose institutions such as the proposed IDB.

Non-profit organizations can play a significant role in all of these tasks. Such organizations—both national and international—are usually most effective in conceiving and carrying through experiments, because they can move quickly to seize new opportunities and also sustain commitments for the long periods that are often required.

#### CONCLUSION

Mr. Chairman, in the hope that it may be useful to the Committee in your review, we would be glad to submit copies of a letter that a small private group recently submitted to Dr. Frank Press regarding U.S. objectives, strategies, and tactics for the UN Conference.

We also underscore the importance of the special studies that are being carried out by the National Academy of Sciences and the National Research Council, under the leadership of Dr. Guyford Steyer. This effort will contribute to the U.S. government's preparations. It also will establish standards for involvement of the world-wide professional community, thus tending to depoliticize the Conference.

In closing, we would like to characterize the general public perceptions of the forthcoming UN Conference. Many basically interested individuals throughout the United States are ambivalent about the Conference. One reaction of goodwill reflects the great reservoir of American humanitarianism along with a willingness to help solve problems. Another reaction of skepticism reflects the negative feelings about demands of the IDC's and about the comparatively limited accomplishments of past UN conferences. Generally, however, the strategic issues at stake are not widely understood.

In this connection, we were impressed that former CIA Director Colby made the following remark last May at a special Congressional Seminar on U.S. National Security during the period from 1977 to 2001. He pointed out that:

"... there are real strategic problems ahead, and we have to put the fact of the imbalance of economics and of social good in the world into our equation when we think of strategic security... expenditures must also be used to conduct positive political and economic programs with respect to that three-quarters of the earth's humanity that lives in the third world so that we can get these peoples of the world to be our friends instead of our enemies. Indeed such underdevelopment is the most dangerous problem we have. We need to avoid another myopia in which we focus on a numbers balance in weapons, and instead turn to a consideration of what is sufficient to meet the threat—the threat in the super weapons, the threat in the conventional weapons, but also the threat in terms of economic and political chaos around the world."

We believe that the only way to proceed is for the United States to take the Conference seriously. The U.S. must try to evolve new concepts about how to deal with the urgent global issues related to development. As we attempt to use our considerable capabilities in science and technology to serve our larger interests—not least in world peace and stability—our policies must integrate two deep-running principles: first, a positive defense of our proven values, which have inspired worldwide concepts of what constitutes a proper standard of fulfilling human rights and human needs; and, second, an authentic dedication to the aspirations of the peoples in other lands with whom we hope to live in constructive harmony.

Thank you. We would be glad to try to answer any questions with our colleagues on the panel.

Senator SCHMITT. Thank you, sir. Mr. Stein?

Mr. STEIN. It is hard this late in the day to come up with very many new thoughts, so I will try to summarize and provide a few impressions from being here today. I would like to join with those who pre-

ceded me in expressing my thanks to the subcommittee for holding these hearings this early in the Conference preparations and hope they stay as active in the preparations through the Conference and, as I will mention later, after the Conference as well.

The point I wish to make at the outset is that the Conference is about development—this point has been made before—and how science and technology can be used for it.

Without further defining basic human needs or saying it is what developing countries want or really don't want, I think the basic ingredients of life are things which can be assisted by the introduction of science and technology.

Mr. Carey before mentioned what some of these ingredients are. There is a very key role here for the application of science and technology.

But certainly countries must define their development goals first, before they can address the way in which science and technology can help.

They must pick and choose among technologies, selecting those for themselves which they believe are most appropriate for the development they have chosen.

And I think this is very important, they must be committed to it, to a set of priorities which will assist the development. To quote Robert McNamara and the statement he made to the Board of Governors at the World Bank this year:

It always comes down to a question of priorities. More foreign exchange for importing private automobiles; or an expanded bus fleet. Elaborate government offices or squatter settlement upgrading. A new generation of jet fighters for the air force, or a new generation of infants who will live beyond their fifth birthday.

If these are the problems, then the task we have today, is to identify what should be done about it internationally and domestically, and how have we been doing in pursuing those goals. If time permits, I would like to very briefly note some of the activities that my organization, the International Institute for Environment and Development would like to carry out. We have been involved in a number of the U.N. conferences in the past, and I have been privileged to serve on the U.S. delegation to the U.N. Water Conference this past March.

The common themes of earlier conferences, as I will note, are very relevant to this Conference on Science and Technology for Development.

For me the basic purpose of the U.N. Conference is really to engage in a rethinking of science and technology policy to assist the development process.

This is a political conference. As Mr. Carey suggested, there will be an effort to keep many of the issues from arising, but, indeed, some of them will.

The question is how relevant can they be kept?

A second purpose of the Conference should be to assist in developing better relations between scientists and those working in various technological fields of the industrialized world with their counterparts in developing countries and developing these relations within the developing world. This has several aspects to it.

Certainly, the continuation of scientific and technological exchanges should develop through mechanisms which will permit scientists and

others from developing countries to have more of an opportunity to exchange ideas with their counterparts in other developing countries.

There has been far too little of this kind of exchange and it is very important. The U.N. Conference on Technical Cooperation among Developing Countries, being coordinated by the U.N. development program and scheduled for the fall of 1978, should provide broad gauged opportunity for initiating these contacts which later can be followed up by the U.N. Conference on Science and Technology for Development.

At ITED we are sponsoring this sort of contact in our followup to the U.N. Human Settlements Conference by enlisting research support from institutions in Asia, Africa, Latin America, and the Middle East, and bringing them together to discuss how the Habitat resolutions are being implemented.

One of the purposes of promoting these relations should be to give scientists and others from the developing world an opportunity to identify their own set of development priorities. We should not come to the Conference only with our own set of issues, but we should be ready to listen.

A third concern that should be expressed is to integrate into the Conference process some of the suggestions which have already been agreed to by countries and which bear on science and technology for development.

I was pleased to see in the administration's statement that these will be taken into account in the preparation for this Conference.

What we need now are specific concrete ways to accomplish the goals, to examine the efficiencies in technological development that are required, and finally, we need to get specific commitments from governments on what they will do, in order to make the goals a reality.

The uses of technologies which are considered appropriate for particular sorts of development must be given greater emphasis. Bill Ellis, I am sure, will speak more about these issues in his statement. It also requires, I believe, more information about the appropriate contexts for technology. Not only is the context for technology important but the purposes or goods for which that technology is going to be used must be carefully considered.

A fourth concern is a continuing and increasing recognition that development "must be sustainable."

It must, by its very nature, continue to work over the life of the development process. There have been too many instances of failure because technological, managerial, institutional, environmental, social and cultural factors interfered with longer range success. Certainly, not all aspects can be either anticipated or avoided, but many can be.

While listening to others, and planning our own development strategy, we should carefully bear in mind the kinds of approaches which have worked, or are likely to work, and not be ready to accept any request, merely because it is made. The technologies we utilize must be appropriate to development, and the development must be designed to fit the needs of the people, the poorest people in many countries. They must be technologies that people can understand, and manage.

This is the point made by Harvey Wallender, but it is not only to develop better management. It is also developing technologies which are easier to manage.

Finally, and this is very important, the Conference must fully plan for an effective followup which is built into the Conference process itself. This must be done both on an international and national level. The Administration's statement this morning did not recognize this. It stated that the Conference was a culmination of 2 years of preparatory effort. It did not say anything about whether there were going to be any followups to the Conference, which would be planned now, and conceived of now, so they can flow from the Conference after it is held.

More than a culmination, the Conference is like a commencement, in that many commencement speakers—I am sure Father Hesburgh, if he were still here, would concur—say you are ending one phase and beginning another. It is indeed the implementation which follows the Conference which is much more important.

The United States, I believe, has a great responsibility to make sure that it comes to the Conference with a defined concrete statement of what it will do to help, and the commitment to act on this statement after the Conference is over.

I would like to briefly turn to a few comments on the U.S. Conference plans.

As I said, we have had a special responsibility to make sure the Conference indeed, one which we offered to host, is as successful as possible. Some of the ways in which we can do it are: first, we can use the Conference both for domestic and international purposes as a vehicle for rethinking U.S. science and technology policy as it relates to development, especially for the poorer segments of society, both in this country and others.

Are we going to use it for that purpose, or are we going to use it for the purpose of preparing for an international conference? This is being done in the formulation of the U.S. national paper, and my question is, will it be carried through in terms of domestic policy beyond the Conference?

The experience of U.N. conferences in the past that is very often national papers get lost in the shuffle while attention focuses on seeking agreement on a set of recommendations.

According to some U.N. officials there probably will be 50 or 60 national papers, while there may well be up to 150 governments. I hope there will be more papers but this isn't unusual. A good deal of time goes into the preparation of this paper. So that the basic usefulness, I believe, of the country papers is for the country to use it itself to help shape and guide its own policies.

How will this happen within the United States? How will the paper be integrated into U.S. policy? What kind of input will be gotten from outside interests, in terms of the preparation of the paper itself?

The statement this morning indicated it would be drafted by a small task force, and I will come in a few minutes to the question of what other inputs might be included.

The input should come first within the Government, from a wide variety of agencies, because there are a lot of activities which are going on right now within different aspects of the executive branch which are relevant, and they should be included, as I am sure they will be.

I am pleased that the statement this morning mentioned and urged congressional participation, and I would like to second that and urge that congressional participation be both full and frequent.

The next question is, what sort of outside interests will there be?

Here, if I can digress for a moment, I think of a statement that my wife has made about the composition of her high school class. She grew up in suburban New York City. She said her high school class was one-third black, one-third Jewish, and one-third "other." I think it's that "other" category which many of us feel we are being lumped into, with the Government having one role in preparation, the scientific community having a second role, and there are a great many of us who are "others."

I hope that the "others" will have an opportunity, not only to provide information to those who are formulating the policies, and what has been pointed out, is being done both through the National Academy of Science, National Research Council work, and through the hearings that the State Department will sponsor itself, but also through the opportunity to participate in a very genuine way, in the decisionmaking and in the formulation of policy.

In a meeting on September 20, coordinated by the American Association for the Advancement of Sciences and a number of other groups, Ambassador Wilkowski stated her intention to develop the kind of group which has been successfully used in the preparations by the U.S. for the Water and Decertification Conference, a single group which included both individuals from the relevant Federal agencies, as well as those from the scientific, university, business, labor, and other private communities.

I hope plans will be made to activate such a group and activate it quickly, since, indeed, the next formal preparation for the Conference will be a meeting held in late January or early February at the United Nations, at which time the subject areas for consideration by the Conference are going to be addressed.

A final aspect of inclusion of these actors in the process, is that I believe they should have the widest possibility to participate as observers in the formal U.N. sense, in the Conference process.

The Conference has not yet considered the rules of procedure which will include this item, but I hope that the U.S. Government will commit itself to seeking provisions which will permit participation of the broad range of groups that can contribute to the Conference.

Given the time, I will just mention that we are hoping to be quite active as a group in the U.N. Conference, both within the United States and internationally.

We believe that a group of international experts should be convened for the Conference, one which would have a three-part approach. One, the group would first meet before the Conference Preparatory Committee which is going to consider what the agenda items are. This will address the priorities for the Conference.

Second, the same group will met at the Conference itself to try to develop a set of Conference goals to be used by the Conference and, third, the group will meet after the Conference to provide an audit function.

We have discussed this idea with a number of officials. Recently, Lady Jackson, the president of the Institute, has received a letter

from Mr. da Costa, Secretary-General of the Conference who stated he thinks the approach is very constructive, and envisions the possibility of the full integration of this approach and these inputs into the Conference proper.

I hope that this will happen.

Thank you, Senator.

[The statement follows:]

#### STATEMENT OF ROBERT E. STEIN

Mr. Chairman and members of the committee, thank you for giving me the opportunity to testify at the hearings on the subject of U.S. and international preparations for the United Nations Conference on Science and Technology for Development, scheduled for the fall of 1979. The International Institute for Environment and development has followed the preparations for the Conference because we believe this Conference provides a very significant opportunity for countries and individuals to reexamine in a fundamental way the roles that science and technology can play in assisting development for people all over the world.

The point I wish to make at the outset, indeed one to which I will return a number of times, is that the Conference is about development, and the uses of both science and technology for development. It certainly is true that both science and technology can be used more effectively to help countries, especially the poorest countries of the world, to meet the basic human needs of their people. (Although it is clear that the emphasis of this Conference is on development for the developing countries of the world, it should not exclude consideration of the ways in which science and technology can be used more effectively to advance development in the more industrialized countries.)

The phrase basic human needs has been much used in recent years, often without further definition. Here I take it to include food to avoid malnutrition and to meet the physical requirements of productive life; shelter and clothing to ensure reasonable protection against the rigors of climate and the environment; and public services for education, clean water and health.<sup>1</sup> All these basic ingredients of life must be achieved with awareness of their effect on natural systems.

In each of these areas, as with many others, there is a key role for the applications of science and technology. But, as Robert McNamara, the President of the World Bank put it: "It is rather the institutional and political constraints—not physical or technological limits that are the greatest obstacle."<sup>2</sup>

Therefore, the point should be made countries must define their development goals before they can address the ways in which science and technologies can help. Then, they must pick and choose among technologies, selecting those most appropriate for the development they have chosen. And, they must be committed to it, to a set of priorities that will assist development. Again, to quote Mr. McNamara:

"It always comes down to a question of priorities. More foreign exchange for importing private automobiles; or an expanded bus fleet. Elaborate government offices or squatter settlement upgrading. A new generation of jet fighters for the air force, or a new generation of infants who will live beyond their fifth birthday."<sup>3</sup>

In my statement this morning I would like to first describe what, in my opinion, the international preparations should emphasize in the Conference process, and second, what kinds of activities the U.S. might engage in in order to develop an appropriate position for the Conference itself and perhaps more importantly to use the Conference process for its own purposes. Third, I will briefly outline some of the activities that the IIED would like to carry out as part of its own small contribution to the Conference process.

At this point, I should mention that the IIED has been both a participant in and observer at a number of the UN conferences that preceded and will feed into the Science and Technology Conference. The Institute coordinated a symposium

<sup>1</sup> These aspects of human needs are also set out in the Address to the Board of Governors of the World Bank by Robert McNamara, September 1977, p. 28.

<sup>2</sup> *Ibid.* at 29.

<sup>3</sup> *Ibid.* at 27.



before the World Food Conference, The Vancouver Symposium at the UN Human Settlements Conference, and also held a symposium in preparation for the UN Water Conference. Each of these symposia issued statements designed to contribute to the official UN Conference process and focused the attention of delegates, media, and others on those issues and proposals that an international group of experts considered to be of priority importance for discussion at the conference. As will be noted later on, we hope to be able to coordinate a similar symposium for the Science and Technology Conference.

#### THE PURPOSE OF THE UN CONFERENCE AND INTERNATIONAL PREPARATIONS

As noted, the basic purpose of the UN Conference is to engage in a rethinking of science and technology policy to assist the development process. There has been some comment in the preparations for the Conference which laments the fact that the Conference is being conceived of not as a science and technology Conference as such but as a "political conference." But the title of the Conference itself as well as many of the preparatory documents give continuing emphasis to the political nature of the Conference. The Conceptual Background to the Conference describes the main purpose as "the whole complex of policy considerations concerned with the accelerated application of science and technology to development at the national level and with increased international cooperation." Further, at the first preparatory meeting for the Conference the Undersecretary-General for Economic and Social Affairs of the U.N. stated that preparations for the Conference could not be separated from a general consideration of the requirements for development and must take into account the entire gamut of development problems. The U.N. and other groups have been carrying out a rethinking over a period of years. The World Plan of Action for the Application of Science and Technology to Development drafted by ACAST (the Advisory Committee on the Application of Science and Technology to Development) is now in the process of being revised to consider some of the newly recognized elements of resource scarcity, environment and newer technologies. This is as it should be, but the nature of the political debate must be relevant to science policy and not stray to other current political issues.

The Science and Technology Conference must, if it is to succeed, view development in the context of what is necessary for the 1980's and 90's since the plans have already foreclosed what basically can be done during this decade.

A second purpose of the Conference should be to assist in developing better relations between scientists and those working in various technological fields of the industrialized world with their counterparts in developing countries and developing these relations within the developing world. This has several aspects to it. Certainly the continuation of scientific and technological exchanges should develop through mechanisms which will permit scientists and others from developing countries to have more of an opportunity to exchange ideas with their counterparts in other developing countries. There has been far too little of this kind of exchange and it is very important. The UN Conference on Technical Cooperation among Developing Countries, being coordinated by the UN Development Programme and scheduled for the fall of 1978, should provide broad gauged opportunity for initiating these contacts which later can be followed up by the UN Conference on Science and Technology for Development. At IIDD we are sponsoring this sort of contact in our followup to the UN Human Settlements Conference by enlisting research support from institutions in Asia, Africa, Latin America and the Middle East, and bringing them together to discuss how the Habitat resolutions are being implemented. One of the purposes of promoting these relations should be to give scientists and others from the developing world an opportunity to identify their own set of development priorities. We should not come to the Conference only with our own set of issues, but we should be ready to listen.

A third concern that should be expressed is to integrate some of the suggestions which have already been agreed to by countries and which bear on science and technology for development into the Conference process. Since the U.N. has held seven conferences between Stockholm and Desertification (from 1972 to 1977) how are the conclusions of these conferences which bear on science and technology being taken into account by the Science and Technology Conference preparations? We do not need another conference to agree that we must more widely use renewable energy sources, or that shelter and water for all are desirable goals. This has already been agreed. Now we must agree on how to accomplish the goals, to examine the deficiencies in technological development

and the institutions that are needed, and to get specific commitments from governments on what they will do.

The uses of technologies which are considered appropriate for particular sorts of development must be given greater emphasis. William Ellis of TRANET will in his statement address the question of appropriate technology. What is really needed is a way to evaluate which kinds of technologies can do the job best for a particular country at a particular stage of development. This requires that countries and individuals within countries, especially developing countries, know about the availability of these technologies and be able to factor them into the development process. It also requires more information about the appropriate contexts for technology, recognizing the shifting urban-rural balance, and a need to stem the flow to the cities. The common themes of the past conferences and their institutional contexts must be integrated into the setting for the 1979 Conference.

A fourth concern is a continuing and increasing recognition that development "must be sustainable." It must, by its very nature, continue to work over the life of the development process. There have been too many instances of failure because of technological, managerial, institutional, environmental and social and cultural factors interfered with a longer range success. Certainly not all aspects can be either anticipated or avoided, but many can be. While listening to others, and planning our own development strategy, we should carefully bear in mind the kinds of approaches which have worked, or are likely to work, and not be ready to accept any request, merely because it is made. The technologies we utilize must be appropriate to development, and the development must be designed to fit the needs of the people. Governments, international lending institutions and the private sector must all recognize this.

Finally, since one of the fundamental purposes of the Conference is to affect development through the more effective uses of science and technology in development, the Conference must fully plan for an effective followup which is built into the Conference process itself. This must be done both on an international and national level. Too often U.N. conferences end with a long list of recommendations but no mechanism for identifying priority areas which should be implemented, and for determining how the implementation will take place (e.g., the Habitat and Water Conferences). The U.S. has a great responsibility to make sure that it comes to the Conference with a defined concrete statement of what it will do to help, and the commitment to act on this statement after the Conference.

These tasks are large, and although there has been much progress in regional meetings and other preparations, overall coordination of planning has been missing.

The General Assembly (Committee 2) has only this month affirmed that the Secretary-General of the Conference has full responsibility for the coordination of all substantive work of the Preparatory Committee. This decision should permit the Secretariat to fully organize itself, and with the cooperation of other parts of the UN system, prepare for the Conference, now less than two years away. The Secretariat will need active cooperation from a large number of governments who will be formulating their own positions. As I understand it, there has not been very much "active preparation" on the part of a number of governments.

#### U.S. CONFERENCE PLANNING

The next section of my statement is devoted to a number of areas that I believe the U.S. should adopt as part of its preparations for the UN Conference. Some of these will be similar to those expressed above since as one of the most active countries in the UN we have a special responsibility to make sure that an international conference, indeed one which we offered to host, is as successful as possible. (At this writing the final selection of host government has not been made.) How can we assist in doing this?

The first way in which the U.S. can assist is to use the Conference both for domestic and international purposes as a vehicle for rethinking U.S. science and technology policy as it relates to development especially of the poorest segments of countries. Is U.S. policy moving in the right direction? Have agencies or programs adapted to these new needs or have some programs lost their usefulness? Are they really gearing up to meeting the new issues which are considered so important both to the Carter Administration and to the international community, such as concern with meeting basic human needs and the uses of science and technology to accomplish those purposes? Is this being done

in the formulation of the U.S. national paper and will it be carried through in terms of domestic policy for the Conference? The experience of UN conferences in the past is that very often national papers get lost in the shuffle while attention focuses on seeking agreement on a set of recommendations. The basic usefulness of the country papers, a use which is often lost, is for a country to use the paper itself to help shape and guide its own policies. The U.S. has identified a number of cluster areas which cover the major areas of concern. They are population, food and health; energy, resources, and environment; climate, soil and water; employment, trade and industrialization; and urban settlements and transportation. How they will be integrated into U.S. policy—not just the U.S. paper—remains to be seen.

How have other executive agencies of the government been brought into the discussion: DOE, AID, EPA, HUD, NASA, Commerce, CEQ, etc? Will there be effective and continuing Congressional participation in the U.S. process, as there should be? In the past, Congressional delegates to UN conferences were selected only shortly before the conference itself. There is now a distinguished head of the U.S. Delegation. Why can't Father Hesburgh be joined by several appointed Congressional members who will be able to closely follow U.S. preparations and the process as a whole? Is the UN Conference going to be used by the U.S. as a vehicle for influencing U.S. opinion towards recognizing some of the constraints of the future, the roles of science and technology in meeting the needs of a conserving society, and basic human needs for our own people as well as those around the world?

These are some of the issues. One question that should be addressed is which group or groups will be able to help provide the answers? The UN considers the Conference primarily to be a governmental Conference, and members of the scientific community correctly agree that there should be an effective scientific grouping included. The rest of us are lumped together as "others," and it is my belief that the others should have a significant voice in both the U.S. and international preparations. Hopefully, these hearings will yield some new information about the plans of the U.S. government in its preparations. What will the U.S. coordinators do to genuinely include a variety of segments of the public in the debates and discussions leading up to the UN Conference? Will the same group be utilized after the Conference to try to help the U.S. government seek implementation of the Conference recommendations? To now the emphasis has been on help for the U.S. paper—much more is needed.

At a meeting on September 20, coordinated by a number of private organizations, Ambassador Wilkowski stated her intention to continue the kind of groups successfully used in U.S. preparations for the UN Water and Desertification Conferences—a single group including individuals from the relevant federal agencies, as well as those from the university, business, labor, scientific communities and other private organizations or individuals. I sincerely hope that plans will be made to activate such a group prior to the next international meeting preparing for the Conference, the fourth session of the Committee on Science and Technology for Development which will take place in February of next year. At this meeting the agenda of the next full preparatory meeting will be discussed, as well as a number of other items of importance to Conference preparations. The UN documents prepared at the first preparatory session to the Conference note that each of the regional commissions which have held meetings in 1977 will recommend a maximum of five subject areas for consideration by the Committee on Science and Technology for Development at its January/February 1978 session. How will those relate to the U.S. Clusters? Will a body such as the kind which Ambassador Wilkowski indicated would be formed have the opportunity to consider the range of issues? It is very important that a broad group be used because, among other reasons, these non-governmental actors—business, labor, university and public interest groups—will basically be the groups asked to carry out what is agreed upon at the Conference.

An additional aspect of inclusion of actors interested in the Conference process is facilitating their participation as observers in the Conference process. The Conference has yet to consider its rules of procedure which will include this item, but the U.S. Government should commit itself to seeking provisions permitting participation of a broad range of groups that can contribute to the Conference.

If the U.S. is the host, then a wealth of additional preparatory responsibilities will rest on the shoulders of the U.S. planners. If this is the case, I would strongly urge that the government consult with earlier hosts, such as the

Canadians, to learn from their experiences in preparing for the UN Human Settlements Conference

A final point on this subject. There are a number of "networks" already in existence or being formed of groups in various parts of the world which will be, I hope, valuable assets to the Conference preparations. Groups such as ICSU, TRANET, and those institutions participating in the Lund meeting on science and technology are but a few of the "more formal groups." They too must be tapped, and tapped earlier rather than later in the conference process.

#### IIED PLANS FOR THE CONFERENCE PERIOD

In this last section, I would briefly like to describe some of the activities mentioned above. IIED has organized distinguished groups of internationally we hope to engage in an stimulate, as part of the UN Conference process. As known experts around the subject matter of particular conferences with the aim of providing a grouping of priority issues for all the Conference participants. The statements of these groups have augmented, enlivened and helped to focus the conference process, and governmental preparations for the conference. Several of the recommendations of the Vancouver Symposium Statement found their way into final Conference Recommendations, and the Statement of Water for All (translated into French, Spanish and Arabic), was widely used in Conference preparation.

We believe that a group of international experts should again be convened for the Conference on Science and Technology for Development and that a three part approach would be desirable. First, the group would meet prior to the Fall 1978 meeting of the Preparatory Committee to set initial priorities. It would meet again at the time of the Conference to help focus the Conference agenda. Finally, it would meet after the Conference, both to review the outcome and develop a priority list, as well as to perform an audit function to put pressure on governments to do what they said they would do. If the report of this group is given adequate publicity we hope it can provide an independent evaluation of those activities likely to move both countries and organizations towards a more effective use of science and technology for development.

IIED's work in other fields is also continuing and will feed into this process.

Our President, Barbara Ward, is preparing a book on "the conserving society" which will examine waste of both physical and human resources and suggest elements of a global strategy to meet basic needs, and more effectively transfer conserving technologies.

We are seeking evidence of the implementation of the Habitat resolutions dealing with shelter for the world's poorest, and cooperating with institutes in Asia, Africa, Latin America and the Middle East to do this.

We are building on agreement at the UN Water Conference to explore ways in which technologies can be more effectively used to secure water for all, and water to produce food, with special attention to avoiding diseases and eliminating waste.

We are reviewing energy requirements in developed countries to assess the potential of vigorous promotion of energy conservation and how renewable sources of energy can alleviate longer term energy problems.

In all this IIED has selected what it believes to be important issues of environment and development. We believe that with effective preparation, the UN Conference on Science and Technology for Development can be a crucial vehicle for advancing and seeking implementation of these objectives. We certainly are ready to join with others similarly inclined who hope to make the Conference process a useful one.

#### INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT

IIED, a non-profit foundation with offices in London and Washington, works as a catalyst between the UN and other international institutions, national governments, and non-governmental organizations. Its activities often relate to those of the United Nations calendar and priorities in the environment and development fields. Currently, IIED is especially concerned with the issues of future energy, the development of sufficient shelter and clean water for mankind, the resources and environment of Antarctica and the Southern Oceans, the environmental consequences of major aid programs, and the use of science and technology for development. IIED runs an environmental information unit for the press, called Earthscan, and maintains close working contact with

many non-governmental organizations working in similar fields around the world.

The Institute is funded by private foundations, by UN agencies and certain governments. Its President is Lady Jackson (Barbara Ward) and it has an international Board and Council. IED attempts at all times to bridge the gap between those who have ideas, expertise and enthusiasm in its area of competence with those who make national and international decisions.

Senator SCHMITT. Thank you, Mr. Ellis?

Mr. ELLIS. Thank you.

I would like to summarize my testimony and divert from it in light of two meetings I just returned from, one in Vienna and the other in Geneva. Both were associated with the U.N. Conference to some extent and more specifically to appropriate technology.

The meeting in Geneva was hosted by the Netherlands Government and brought together government representatives from Great Britain, Norway, Sweden, Canada; appropriate technology developers from Kenya, Venezuela, Columbia, and Indonesia; representatives from the World Bank, UNDP, UNTAG, UNTO, and ILO; and a number of other A.T. experts.

The conclusions of this group, or perhaps the premise on which it started, was that the Conference was not going to be effective but that the concept of "appropriate technology" was too important to be left to chance.

As a result, the group recommended the establishment of I.M.A.T., an International Mechanism for Appropriate Technology. This organization would be patterned somewhat after the Consultative Group on Agriculture Research. It would have a very small staff, hoping to sensitize other agencies and other national governments to the concepts of appropriate technology.

Further study on IMAT is being moved forward by the Netherlands Government in collaboration with ILO and UNDP.

The Vienna meeting at UNIO was quite independent of the Geneva meeting, but started with very much the same premise, that the U.N. Conference was not giving adequate attention to small-scale alternative industrial technology. And therefore, consideration of these technologies should be developed, and would be developed, outside the framework of the U.N. Conference.

Although these meetings themselves tended to ignore the U.N. Conference, I found a number of attendees who were working toward changing the Conference's terms of reference. The Dutch Government, for example, is including a section on appropriate technology in their national paper. A group of African universities are petitioning their governments to urge a change of reference at the next preparatory meeting to bring appropriate technology more specifically into the preparations of the U.N. Conference.

The general thrust of all of these activities are very much along the same lines I have put forward in my written testimony. In particular, with the comments on endogenous development. The concern here is that technology transfer from developed countries is not enough. We need a new definition of development. The argument which comes from the Third World is very well stated by Poona Wignaraja of the U.N. Asian Development Institute. "Development," he says, "is not an imitative exercise of borrowing ready-made pages of capital and technology. It is an endogenous process by which each country needs to opera-

tionalize for itself." This concept is being repeated again and again by Third-World countries and by development experts.

Economist Hans Singer, who was at the Geneva Conference, emphasizes this in his new book, "Technologies for Basic Needs." He demonstrates that factor endowments in most Third World countries are very different from those of the United States and other industrial countries. The technologies being developed, however, are only for our mixes of labor, capital, markets, and natural resources. Dr. Singer holds that there is no reason to believe that efficiency and size have logical relations to one another. The relations between size and efficiency are a mistake of history and do not hold true in conditions other than those of the United States and Europe.

If we accept a new definition of development as required along the lines of these studies, then we must examine new mechanisms for development. Some of these I have outlined in my written statement. It is a fuller analysis of these kinds of mechanisms that I urge be included in our preparations for the U.N. Conference.

The second point I make in my paper under the title "Global Future". A major stimulus for these thoughts is a study entitled "Catastrophe or New Society: A Latin American World Market." This study was conducted on a computer at the Fundacion Bariloche in Argentina by a group of Latin American scientists and scholars. It indicates that the Third World countries would be able to meet basic human needs if, and only if, the industrialized countries can find ways to decrease their appetites for raw materials. Another report given in Geneva last week was "Indonesia in the Year 2000." One quote from that report, which came from the Prime Minister's Office, states, "Indonesian problems are multiplied by the demand from the industrial world for Indonesia's natural resources." This conclusion brings Third World problems into convergence with the A.T. or appropriate technology movement, which has been developing from very different premises—those of ecology, conservation, and civil rights—within the United States, Canada, and Europe.

As my paper outlines, the global problem of resources use must be faced, if either the developed or the developing nations are to have secure futures. So my second suggestion for the U.S. preparations, is that we give due attention to the development of a conserver society.

The summary recommendations of my paper are a bit more specific on actions that the United States might take in preparations. There is only one of these I would like to draw specific attention to. That is the last one. And the following discussion on human rights. It is, I suggest, inherently impossible for governmental delegations to carry on the kinds of exchange and reevaluations required to make science and technology relevant to the basic needs of people. And unlike big business, or big labor, or big science, the appropriate technology groups I have mentioned, and the citizen action groups who are most involved in this reevaluation, do not have the funds to develop their positions or to have an effective input to the U.N. Conference. If the United States is seriously committed to the rights of all citizens so to have their views heard, to speak up on issues that affect their lives, then it should make sure that the mechanisms are developed to highlight minority views at UNCSTD.

Two avenues suggest themselves in this regard. First, funds should be available for the development of alternative position papers for the

U.N. Conference, in parallel with the official U.S. position. Second, particularly if the United States hosts the Conference, but even if it does not, the United States should strongly support with independent funds as well as with policy statements a nongovernmental forum like those which have been held in conjunction with every other U.N. Conference of this decade. So that people from all parts of the world can exchange ideas freely without the stultifying confines of diplomatic channels.

To summarize, there are three points I have developed in my paper. First, the need for endogenous growth of technological capability by the people in the villages of the Third World. Second, the need for global evaluation of the use of the natural resources so that all nations may have a stable and constructive future. And third, the need to develop mechanisms so that the people of the world as well as the governments can exchange information and ideas on the role of science, and technology, for human development.

I think that pretty well summarizes what I have developed, in more detail in the paper, and I will stop there.

Thank you, Senator.

[The statement follows:]

#### STATEMENT OF WILLIAM N. ELLIS

##### SCIENCE, TECHNOLOGY, AND THE HUMAN POTENTIAL

Mr Chairman, I'd like to thank you and the committee for giving me this opportunity to discuss the U.S. preparations for UNSCTD, the U.N. Conference on Science and Technology for Development.

I am William N. Ellis, an engineer and physicist, currently an independent consultant and coordinator of TRANET, a Transnational Network for Appropriate/Alternative Technologies. I am testifying primarily in the latter capacity.

TRANET is a world wide coalition of, by, and for some 200 A.T. Centers. Its purposes are 1) to help these groups maintain contact with one another, and 2) to heighten the dialogue on the A.T. Concepts. TRANET was initiated at the HABITAT Forum of the U.N. Conference on Human Settlements held in Vancouver, Canada, May 1976. A major concern of the A.T. groups which met there was the plans then forming for UNCSTD. We all felt that science and technology were too important to be left to either the scientists or the national bureaucracies. We felt that science and technology must be redirected to better fulfill the human potential. These views are expressed in an "A.T. Resolution" which is appended to this statement. This resolution concludes that "the U.N., its technical agencies and its member governments should:

Develop new policies and programs for science and technology which give greater attention to the basic needs of people,

Emphasize and support the development of technologies which are in harmony with nature, are culturally fitting, provide meaningful employment, are low cost, are small scale, are easily maintained, and which lead to local self reliance and the dignity of humans as well as their physical comfort, and

"Consciously redirect technological programs and scientific research toward improving the well being and autonomy of the lesser advantaged nations, communities, and individuals."

Many adjectives have been used to describe what we call A.T.—"soft," "intermediate," "democratic," "ecological," "appropriate," and "alternative" are among them. No one of these words is adequate. Perhaps the three statements of the A.T. resolution above will give an idea of the concepts A.T. embraces.

Our concern with UNCSTD is, then, of some length in time and some depth in feeling. We have followed the developments for UNCSTD both on the international sphere and within the U.S. and we are increasingly disappointed with the results of both. My concern here is primarily with the U.S. preparations. I would like to group my comments on the U.S. preparations around two basic themes;

1. The U.S. should give increased attention to the development of endogenous appropriate technologies in the Third World and de-emphasize its concern with technology transfer, and

2. The U.S. should initiate a study of the global future which all nations share and which is currently threatened by inappropriate technologies.

#### ENDOGENOUS DEVELOPMENT

##### *Technology transfer*

On the first issue the red flag for your attention are the words, "technology transfer." I'm sure that you have already heard them many times in your deliberations. The multinational corporations are concerned that "technology transfer" means giving away their jealously controlled intellectual property; the labor unions fear that "technology transfer" means transferring American jobs overseas; the scientific community argues that we need more R&D funds to develop the technologies needed for effective "technology transfers." They all believe that the Third World is sitting and waiting eagerly to transfer the technologies we have developed. These issues are important, but they are not all. If you listen carefully you can hear the Third World trying to tell us something very different.

Donatus deSilva recently gave the following picturesque view of "technology transfer" as seen from the Third World in a statement from UNEP in Kenya.

Senior executives from multinational corporations dressed in dark, impersonal protocol suits, carrying lawyer's briefcases, speaking with quite, smooth voices, are followed by a retinue of assistants and secretaries. . . . Cocktail parties are hosted. A rustle of papers, a flourish of pens, flashbulbs pop . . . and another agreement is signed. A triumphant photograph of the Corporation Executive shaking hands with the minister of planning appears in the next day's newspapers. . . . Literate entrepreneurs replace village elders and their age old wisdom. Alien life-styles creep in. Vast numbers of rural folk are thrown out of work because traditional occupations are undermined. They flock to the city where modern industries are located creating the growth of slums. . . . And thus another technology has been transferred.

Indian physicist A.K.N. Reddy puts some numbers behind his argument for locally built technologies in place of technology transfer. Reddy compares the results of one large coal-based fertilizer plant in a city to 26,150 small village bio-gas fertilizer plants. The biogas plants "save \$25 million in precious capital, and \$70 million in foreign exchange; it generates 130 times as much employment; it helps arrest the disastrous drift to the city slums and shanty towns; it reduces the dependence on the developed world because the bio-gas plant can be indigenously evolved; and, it increases self-reliance in two fundamental needs—fertilizer for growing more food and energy for cooking it."

A team of Latin American scientists and scholars working in connection with the Fundacion Bariloche in Argentina developed a model for World growth taking human welfare in terms of food, housing, health and education as goals rather than GNP as is common in the industrialized nations. They found that each major geographic area could be self sufficient without foreign assistance. However, it would call on the industrial countries of the North to curb their appetites for the natural resources of the South.

##### *New definitions for development*

One of the strongest and best developed pleas for a redirection of the UNCSTD preparations has come from a group of Asian scholars working with the U.N. Asian Development Institute. They strongly condemn the "top down process (of development) with emphasis on industrialization, modernization and urbanization" which has "increased the dependence of the poorer countries on the rich and widened the gap between rich and poor within the poor countries." They argue that "this old framework implied the existence of one stock of scientific knowledge and a technological pool in the developed countries which was to be transferred to developing countries." But, "development is not an imitative exercise of borrowing ready made packages of capital and technology, it is an endogenous process which each country needs to operationalize in keeping with its own values, political system, and resource endowment. . . ."

These are only a few of the statements coming from Third World statesmen which call for assistance in developing their own technological capabilities rather than merely transfer technology to them. A few of these are much stronger and demand a moratorium on technology transfer so that the developing countries will not become enslaved by foreign sources for parts and services,



nor be enslaved by a burdensome balance of payments to absentee stockholders. Other critics are concerned that the technologies we transfer are to produce goods for our own markets rather than those of the poorer nations. Concentration on export markets they say takes land away from producing food for the local poor and provides only the least constructive and lowest paid labor for the developing nations.

The basic tenet of all of these comments is that we need to redefine what we mean by "development." Too often we accept the end goal to be "economic development," "GNP," or "industrialization." Our past thirty years of reliance on this definition of development has been an utter failure. Rather than a decrease in the amount of poverty in the world, it has been increased. Indian economist Romesh Diwan writing in *Economic and Political Weekly* February 26, 1977 notes that if we take poverty to be obtaining less than 2,000 calories a day, and nothing else, the percent below the poverty level in India has increased from 38 percent in 1960 to 54 percent in 1969 even though the GNP per capita has risen.

As long as we hold industrialization and GNP to be the ends of development we will be tied into a philosophy of large scale, capital intensive projects turning out goods for export and the urban rich. Measuring development in terms of material output per worker tells us nothing about the products turned out or about the use to which they are put.

For UNCTSD we should redefine "development" to be "development of the human potential." This means much more than just providing goods. It means giving people the means to be creative in their own terms and for their own welfare. It means listening to the needs expressed by people in the Third World and not sitting here in Washington and deciding behind the ivory towers of some Federal Agency or the National Academy of Sciences just what science and technology is best for the developing world.

#### *Mechanisms for endogenous growth*

Even when the U.S. Federal Government has taken on the task of promoting technologies for the United States itself, a culture of which it is part, it has not always been successful. A case in point is "Deep Freeze Atlantic," a multi-million dollar floating processing plant built by the U.S. Marine Administration after an Academy study had decided that this would be the best way to harvest protein from the sea. What the Academy and the whole Federal establishment failed to recognize was that New England Coastal fishermen had no desire to spend 9 months at sea away from their families manning this technology. After a brief trial run with Norwegian fishermen, Deep Freeze Atlantic was put in drydock at Baltimore where it stands today as a symbol of dehumanized technological development.

If we cannot comprehend and foresee the impact of technologies on our own culture, we should enter the realm of designing technologies for other cultures and other social systems with great trepidation.

Yet the list of tasks the Department of State has given to the National Academy gives little recognition of the need to take the would be recipients into account. And, the recent report from the Academy on *Appropriate Technology* gives no sign that the new definition of development has been recognized.

The major criticism with this approach to UNCTSD is that it tends to suggest that we, the United States, have, or will develop, the solutions to the Third World problems. It is paternalistic at best and confrontational at worst.

The alternative approach is one of listening to the peoples of the Third World; of setting up mechanisms for helping them to identify their own problems, and mechanisms by which we can respond to their requests.

We have in the U.S. a few models which might be given more prominence in our UNCTSD plans and which might be further expanded in other areas of development. One of these is VITA, Volunteers in Technical Assistance. VITA is a network of some 4000 scientists, engineers, economists and businessmen who respond to queries from the Third World providing technical and professional advice on small scale projects. VITA answers some 1200 requests a year and is currently providing assistance to 120 countries. Rather than concentrating on designing technologies it thinks the developing countries will need, VITA responds to requests. This is the sort of mechanism which needs to be carefully considered and extended into other areas. I was pleased to note that at a recent Strategy for Peace Conference held by the Stanley Foundation that Larry Fox, Vice President for International Affairs of the National Association of

Manufacturers, proposed that industry set up a VITA-like response mechanism for Third World industries.

A second U.S. model for a mechanism responsive to the new definition of development is now under consideration by the Peace Corps. Their thought is to use specially trained Peace Corps volunteers to evaluate the energy infrastructure of villages to which they are assigned. They would determine how energy is currently used, what current sources exist, who is responsible for each energy supply, what new forms of energy—solar, wind, biogas, hydro, etc.—might be available, and what use might be made of new energy within the social and cultural pattern of the community. With such an energy analysis the people of the community themselves would be capable of setting specifications for their own development.

A third model of North-South collaboration worthy of consideration has been established by The Farm, a 1000 person commune in Tennessee. The Farm started as a counter-culture commune in the late sixties. But when the big earthquake hit Guatemala in 1976, Steve Gaskin, founder of The Farm, realized that the back-to-the-land techniques they had learned and developed for their own self reliance were equally valid in Third World communities. Farm volunteers not only reconstructed a town of 10,000 with the help of local workers, but also invited Guatemalan Indians to visit The Farm and to learn techniques for health care, self-help housing, small scale farming and other do-it-yourself technologies. (As an aside I might point out that support for this project has not been awarded by the U.S. Government but has been offered by Canadians.)

The Farm is only one of many U.S. groups developing A.T. relevant to the Third World problems. Past U.S. educational assistance to the Third World has brought their most innovative young people to our prestigious Harvards, Berkeleys and MITs to learn the technologies we need for our culture and our industries. The external "brain drain" of these bright young people to our hospitals, factories and services has been bad enough. But, far more disastrous has been the "internal brain drain" of the returning scientists and engineers whose professional existence is dependent on maintaining status in the external scientific community. Research, educational curricula and institutions have been distorted to maintain artificial links to an irrelevant world.

How much better might it be if other A.T. groups in the U.S. could develop exchanges for "hands-on" technologies like that exemplified by Guatemala and The Farm.

#### *A.T. in the Third World*

Of much more importance than the institutions we are establishing in the United States are those being established in the Third World itself. In Karen, Kenya, UNICEF has helped establish a display and workshop for A.T. where local craftsmen show new ideas for water and grain storage, for building earth houses, and for using small farm implements.

In Ghana the Technology, Consultancy Center has designed its own small scale soap making process because the soap plants on the market would produce more soap than could be absorbed in a local market, did not take advantage of local materials, and were based on an unfavorable capital labor ratio.

Los Gaviotos in Colombia has improved the living standards of the rural farmers by developing windmills, hand pumps and other devices which could be made from local materials.

Many such A.T. have been built in the past decade by local people with no outside help, but more and more the volunteer organizations, church groups and U.N. Agencies are recognizing the failure of the trickle down approach to development and participating in self-help programs.

Outstanding but unsung actions have been taken by UNICEF for many years. A recent review of their past and projection of their future "strategies for Global Development" lists many examples of small scale technologies they have developed.

UNEP (The United Nations Environmental Program) has produced one of the clearest definitive documents on A.T. in a yet to be released report of a 1975 meeting of A.T. directors. This report carefully delineates the characteristics of A.T. in three areas—economic, social, and environmental.

Along with VITA, I have been working with the World Bank to help put into action president MacNamara's policy statement that World Bank loans and projects should be consciously directed to directly meeting the basic needs of the poorest people in the poorest nations. Our goal, through the Bank's Office of Science and Technology, is to create links between bank projects and

the A.T. centers around the World. Although this project has been under way for only a few months, we have already created some potentially valuable linkups.

We have noted, for example, that Mexican fishermen were facing technological problems similar to those being attacked by a co-operative of low income fishermen in Maine. An exchange between these groups is being established.

Low-technology waste recycling technologies being developed by the Institute for Local Self Reliance in Washington almost parallel those being developed by the Bank for a project in Colombia. Rodale Press and an A.T. group at Oxford University have been developing low-cost pedal powered devices for doing everything from grinding corn and plowing fields through running a T.V. set. These have been demonstrated within the World Bank Building.

Development is a state of mind more than a collection of technologies. The crucial point of the models cited above are that they help change that state of mind. They promote the concepts of self-reliance and self-respect. These are the types of mechanisms that we should establish if we consider one aim of UNCSTD to be improving the lot of the Third World.

#### THE GLOBAL FUTURE

However, UNCSTD should be much more than an attempt to solve the problems of a part of the World. Science and technology have brought problems but also hold promise for a more humanistic world which all nations can share if we act now.

While one set of roots of the A.T. movement is in development and the problems of the Third World, by far the more extensive roots are in our own heritage. They go back in time at least to the 14th century when Ibn Khaldun warned against the sedentary and polluting culture resulting from urbanizing technologies. They are in the words of Thomas Jefferson who told his compatriots to "let them keep their factories in Europe;" and, in the words of Mahatma Gandhi who foreswore the use of machine made goods. More recently philosophers like Jacques Ellul have shown that mankind is becoming enslaved by science and technology which moves according to its own internal logic irrespective of human needs. As John D. Rockefeller 3rd states in his book *The Second American Revolution*, "We have come perilously close to letting science and technology become our masters rather than our servants."

On more popular fronts the dangers of unbridled science and technology have been brought to our attention by Rachel Carson's *"The Silent Spring"* by Ralph Nader's *"Unsafe at Any Speed,"* and by the student riots of 1960 which took our overdeveloped technological society as a central theme in their worldwide rejection of modern society.

Here, in the halls of Congress the importance and the dangers of science and technology have not gone unnoticed. Senator Hubert Humphrey held landmark hearings on "The Role of Technology in the Nation's Economy" in 1963. In these hearings, Senator Humphrey noted "that the distribution of R&D funds about the nations could make or break a region." Other hearings on the impact of Science and Technology have followed, chaired by Senators Nelson, Harris, Mansfield and others including this committee. An equal number of studies have been held on the other side by the House. Recently Senator Kennedy has been concerned with increasing citizen involvement in science and technology policy-making. And, in the legislative guidance to the Department of State on UNCSTD emphasis on "light capital technologies" is mandated.

But we need not read studies and reports to know that something is wrong with the technological-industrial society we have spawned. If you breathe the air of any city street, including non-industrialized Washington, you know change is needed. If you pay the fuel bills in Northern Maine where I live, you recognize that some kind of crisis is being overlooked. If you were stuck on the 19th floor of a high rise in New York City, the pinnacle of our industrial success, during any energy blackout, you cannot help but question the current system. If you count the unemployed, or fear the resulting street crimes, you must wonder where are the promises to that bright and glowing technological future we have so long believed was coming.

The A.T. movement is not part of the gloom and doom syndrome that dominated the 1960s. We do not see a bleak future. We see a bright humanistic post-industrial age being brought on by science and technology. This is not an age of push buttons and robots doing all our work or of flying at the speed of light to

orbiting villages in space. It is, rather, an age of personal fulfillment, when our work itself is meaningful and creative. When we have more freedom because we are technologically more self-reliant. It is an age with less poverty within nations and among nations. It is an age of decreased reliance on material goods and increased enjoyment in interpersonal relationships. An age when people are involved in the activities of their communities. The key word in Rockefeller's, "The Second American Revolution," are "human dignity," "belonging," "caring," "full potential" and "beauty."

This is not as much a Utopian dream as was the technocratic future which our scientists have been promising for the past decades, and toward which major Federal policies and overwhelming Federal funds have been spent. I remind you that even now, NASA is supporting studies for future communities in space housing thousands of people and completely self sufficient on internally grown food, recycled water, and purified air. It is a little hard to see how we can design such communities for space and yet reject their development on earth.

It is this more humanistic global future toward which a major portion of our preparations for UNCSTD should be turned. In fact, it appears that if we do not take a future conservator society position the U.S. may stand alone at UNCSTD as the one nation concerned only with conflict between North and South.

#### *A.T. in the United States*

In no small way the people of the United States are already well along the way toward accepting the tenets of this post-industrial future. A recent Harris poll was headlined "Mainstream America has Adopted the Social Views of the Turbulent 1960s." The poll found that individuals were rejecting the competitive rat race, distrusted bigness, and were adopting environmental concerns. It concluded that "a value revolution of significant magnitude is taking place in America."

The same concern for a more personal lifestyle is showing up in our demographic patterns. Rural areas throughout the country have suddenly, since 1970, changed from out-migration to in-migration. The only states now losing people are urban states. The 17 fastest growing states are all rural. This "New Ruralism," as I have called it in an article in *The Futurist*, defies all predictions and Federal policies to the contrary. It is marked not only by people moving but by people's attitudes. The rapid decentralization of commerce in the growth of boutiques and small shops, the growth of craft industries, the blue jeans craze, the green plant fad, the spread of country inns, the growth of outdoor sports are all manifestations of the desire for simpler more personal life styles and increased self-reliance.

The mainstream of science and technology has not yet been brought into this second American revolution. But, in the corners and byways of America, unsupported and unnoticed by the Federal bureaucracy there are significant developments. Steve Baer of Zomeworks in New Mexico has invented self closing "solar sky lids" and uses a "solar drum wall" to heat his home. Pliny Fisk of the Center for Maximum Building Potential in Austin, Texas developed low energy building schemes; Malcolm Lillywhite, of the Domestic Technology Institute in Evergreen, Colorado, has helped a fifth grade class design and construct a solar living system; Helga Olkowski and others of the Farallones Institute in California have developed both urban and rural houses which, among other innovations, use only  $\frac{1}{10}$  the water necessary for other homes; Gill Friend and David Morris of the Institute for Local Self Reliance in Washington, D.C. have shown that a city block may be nearly independent for both energy and food by proper use of solar heating, roof top gardens, waste recycling and other conserving technologies; John Todd and other New Alchemists in Woods Hole, Massachusetts (with funding from the Canadian Government) have constructed an "Ark" on Prince Edward Island which makes possible total self contained living. These are only a few of the innovative A.T. scientists who are developing small scale, community technologies for a future society.

They are not only a resource for our own future but are also a resource for Third World development. They have been largely ignored in preparations for UNCSTD in spite of the Congressional mandate that "the United States will place important emphasis on light capital technology in both official statements and informal discussions related to UNCSTD."

#### *Cooperative exchange*

We should recognize also that we may have as much to learn from the developing countries as they do from us. Their concern for conserving materials and energy is far more a part of their culture than it has been ours in the past. For

one example, in Nigeria, Ray Wijewardene has developed a system of droplet control which requires that only one or two quarts of herbicide be used per acre of land compared to the 4 or 5 gallons needed with current U.S. practices.

Their leadership is exemplified by the development of methane digestion from manure and other organic wastes. Gobar gas plants have been used successfully throughout India, Korea and other Asian countries for a decade or more. Universities in the U.S. have been experimenting with methane digesters for a few years and have yet to match the capabilities of the Asian systems. Recently when one of our large million dollar experimental sewage systems stopped generating methane, our top scientists were startled with a visitor suggested adding a little bicarbonate soda. It worked; knowledge long practiced by our less schooled Asian inventors.

Another area in which we may have much to learn from the Asians is in bicycle and other forms of low-cost transportation. Today there is a bike boom in the U.S. based on such facts that 100 bicycles can be made from the materials needed for one automobile;  $2\frac{1}{2}$  billion gallons of gasoline would be saved if all trips of under two miles were taken by bike; inner city trips in most cities can be taken faster by bike than by taxi; bikes get the equivalent of 1,100 miles per gallon of gasoline; bikes do not pollute; and 10 can be parked in a space needed for one automobile. More bikes are now being sold than automobiles in the U.S., 50,000 miles of bikeways have been constructed in the past few years, San Diego has found a dual mode bike-bus system economically advantageous, and San Francisco is experimenting with designs that would make bicycles part of their supermodern BART transportation system. And, yet we have not started to develop the potential of the bicycle as an environmentally sound and energy conserving element of our transportation system. In Asia, the bicycle and bicycle derivatives are already dominant. In bicycles, and perhaps many areas, the Third World is already closer to the future than are the industrialized countries.

The convergence of the A.T. movements of the industrial countries and those of the Third World provides a timely and cooperative environment for a global reevaluation of the role of science and technology in meeting human needs.

#### *The Conserver Society*

The global problems of resource conservation and their allocation must be faced if either developed or developing nations are to survive. A report last month from the Worldwatch places the threat to the world's natural resources as a greater threat to humans than is the arms race. A NATO report predicts an oncoming "metal crisis" which will dwarf the coming "energy crisis." As the study by the Fondation Bariloche pointed out, each geographic region could solve its own needs for food, housing, and health but not if the industrialized North continues to expand its needs for materials and natural resources.

The theme of a global Conserver Society has already been grasped as one of the major issues for UNCSTD. Barbara Ward (Baroness Jackson), whose special books have done so much to set the tone of past U.N. Conferences on the Environment and Habitat has chosen this theme, the Conserver Society, for a book for UNCSTD. The French Government has created a strong tie between its A.T. organization GRETE (Group de Recherche sur les Techniques Rurales) and its development for UNCSTD. The Canadian Government which has recently completed a massive study on "A Conserver Society for Canada" is using this experience in its UNCSTD preparation.

The U.S. will be failing in its role as world leader in science and technology if it misses this opportunity to develop a strong and lasting image of the future world toward which we all must strive.

#### SUMMARY AND RECOMMENDATIONS

In summary, I offer some specific recommendations which will help UNCSTD make the much needed global redirection of science and technology toward human development.

1. *A major effort should be undertaken to bring the views of the Third World into the U.S. planning for UNCSTD.*—Many techniques might be proposed for assuring Third World participation in our preparations. TRANET has offered to convene a meeting of its informal and unofficial Advisory Board of 5 members from each major geographic area (Africa, Asia, Europe, North

America and Latin America) to discuss the potential for UNCTSD. The Society for International Development (SID) has already planned to convene a series of meetings of Development scholars to set goals for the role of science and technology in meeting basic human needs. The U.S. preparatory committee should support and be involved in these actions.

2. *Less emphasis should be devoted to designing technologies for the Third World and more attention should be given to establishing mechanisms by which the local villages and communities can determine their own technological needs.*—I am not urging that the highly skilled and competent scientific community give less attention to R&D devoted to Third World problems. I strongly advocate more such attention. But, I do urge that our emphasis should be on "Science *by* the people" rather than "science *for* the people."

A most constructive way to bring about this innovation in science policy would be to promote bilateral exchanges between the A.T. Centers in the U.S. and the A.T. Centers of the Third World. The Third World communities need the practice and the philosophy of creating technologies from materials at hand. They need technology in their hands—technologies like that developed in the small farms of America. They do not need technology in their heads applicable only to highly specialized industrial societies.

Our well skilled A.T. centers have revived the hands-on technology concept. They should be given the opportunity of serving the world.

3. *The U.S. should avoid confrontation over "Industrialization" and "technology transfer" and concentrate on meeting basic human needs, and in closing the gap between rich and poor within all nations.*—Serious arguments can be given for a moratorium on technology transfer to reduce the technological dependence of Third World. (Read, for example, "Science, Technology and Poverty: The Issues before UNCTSD" by Morehouse and Sigurdson in the current Bulletin of the Atomic Scientists). There are related arguments that the technologies we transfer are related to our own needs and markets and thereby distort Third World goals often increasing poverty and starvation. (See "Food First" by Francis Moore Lappe and Joseph Collins.)

I would reserve judgment on placing a total ban on the transfer of technology. But, I would urge that we carefully reexamine U.S. foreign policies to determine the extent to which they prevent the eradication of poverty. In keeping with the rest of the World U.S. policies should be shifted from the failed "trickle down" concept of development to one of development from the bottom up. In the words of President Carter, "It is time we stopped taxing the poor in the rich countries to help the rich in the poor countries."

4. *A major effort in the official U.S. preparations for UNCTSD should be a future oriented study for a global "conserver society."*—The U.S. shares with the Third World and all other nations threats to our global future which result, at least in part, from scientific and technological advances. The U.S. has taken bold and imaginative steps to overcome some of these CEQ, EPA, the new Department of Energy and the OTA office of Congress are a few of our innovative reactions.

A more positive image of our, and the global, future should be initiated as part of EPA's program for building a sound environment. The future for energy conservation could be developed by the Department of Energy. Our concern for the growing shortages for metals and other natural resources should be developed by the Department of the Interior. And, our own interest in developing technologies for our own poor could be an input from CSA's National Center for Appropriate Technology. All of those should be developed in the context of, because they are unavoidably linked to, the impact of science and technology on development.

5. *The Congress should designate a separate fund for the development of nongovernmental position papers and an NGO (nongovernmental organization) Forum in conjunction with UNCTSD.*—Precedents for NGO forums have been well established by past U.N. Conferences. For Habitat the Canadian Government provided separate funding and built a special facility for nongovernmental organizations.

These forums recognize that Governments by their nature and function are limited in the actions they can take or the recommendations they can make through official diplomatic channels. The NGO forums give the people of the world a chance to bring new ideas into the international debate. And, to exchange among themselves new concepts for human development and human rights.

The central role human rights have taken in U.S. foreign policies gives special emphasis to the need for U.S. support of a free and open NGO forum at UNCSTD.

Individual freedom and self-determination are central tenets of A.T. Small scale, low-cost technologies give the individual the choice of providing his own basic needs and provide him with an increased degree of freedom in choosing his own way of life. If the U.S. emphasizes A.T. in its own position paper it will be providing one sign for its commitment to human self-determination.

But, irrespective of the topic of UNCSTD, we should show our belief in individual self-expression by providing within our own preparation, avenues for alternative, nongovernmental viewpoints. A number of citizen groups, notably the A.T. centers I have mentioned in this paper, have a very positive and creative new view of the role of science in development which should be expressed at UNCSTD.

And, the U.S. should carry its commitment for human self-expression to its logical conclusion by providing substantial support for a non-governmental forum in conjunction with UNCSTD. A tribune at which people from all parts of the world can contribute to world order unfettered by the protocol and mores which bind all governmental delegations.

Whether or not the U.S. hosts this U.N. Conference it should show all the nations its deep commitment to human rights by providing substantial support for an open People's Forum on Science, Technology, and the Human Potential.

#### TRANET BY-LAWS

##### ARTICLE I—NAME

This organization is to be known as TRANET

##### ARTICLE II—PURPOSE

The purposes of TRANET are:

- (1) To stimulate bilateral exchanges between A.T. Centers in all parts of the world,
- (2) To educate scholars, statesmen and the public as to the concepts of A.T.<sup>1</sup>
- (3) To promote a dialogue on the role of science and technology in a post-industrial future, and
- (4) Other purposes as required to promote the development, use, and understanding of A.T.

Towards these purposes TRANET may operate a clearinghouse, publish a regular newsletter, hold seminars, design exhibitions, raise funds, conduct research, arrange tours, act as advisor to the U.N. or other national or international agencies, hold real estate, and take other actions as required.

##### ARTICLE III—MEMBERSHIP

Sec. 1. Membership shall be open to all individuals and organizations with a proven interest in A.T.

Sec. 2. There shall be two classes of membership: An *organizational member* shall be an organized group of people which has contributed at least \$100 annually toward the operation of TRANET and which is approved by at least 6 members of the Advisory Board on the basis of proved competence in developing A.T.

An *individual member* shall be any person who has contributed \$15 or more annually to the operation of TRANET.

Sec. 3. The benefits of all members shall include subscription to a regularly published periodical. Organizational members, in addition, may purchase TRANET publications at bulk rates for distribution to Third World collaborators.

<sup>1</sup> *Organizational members* shall be entitled to nominate a member for any vacant position of the Advisory Board.

<sup>1</sup> Definition: For the purposes of TRANET, "A.T." shall mean "Those tools, devices and processes which lead to economic, social, or environmental improvements in the quality of life by being small scale, low cost, easily maintained, environmentally sound, user owned and/or resource conserving by providing creative employment with optimum use of local resources."

*Each member shall be entitled to one vote in a by-mail election of members of the Advisory Board.*

#### ARTICLE IV—ADVISORY BOARD

Sec. 1. An Advisory Board of 25 members, 5 members from each major geographic area (Africa, Asia and the Pacific, Europe, North America, and Latin America) shall be elected by the membership.

Sec. 2. The Advisory Board shall meet once each year on the first Monday of October in Rangeley, Maine unless other time and date has been established and communicated to the members at least 6 weeks before that date.

Sec. 3. Each board member shall serve for a period of 5 years (except for initial Board members whose terms shall be staggered to permit one new member from each region on a continuing basis).

Sec. 4. A quorum of the Advisory Board shall consist of those members present and voting.

Sec. 5. The Advisory Board shall elect TRANET officers and establish general policies.

#### ARTICLE V—OFFICERS AND GOVERNING COUNCIL

Sec. 1. Officers of TRANET shall consist of President, Vice-President, Secretary, Treasurer and President Elect.

Sec. 2. The officers shall be responsible for selecting an Executive Secretary and any other staff it deems necessary for carrying out the purposes of TRANET.

Sec. 3. The elected officers and the Executive Secretary shall constitute the Governing Council of TRANET.

Sec. 4. *The President* shall be responsible for presiding at all meetings of the Governing Council and the Advisory Board. And for assigning oversight to other members of the Council.

Sec. 5. *The Vice-President* shall preside in the absence of the President.

Sec. 6. *The Secretary* shall keep minutes of TRANET meetings.

Sec. 7. *The Treasurer* shall be responsible for reviewing financial records maintained by the Executive Director and reporting the financial state of TRANET to the members.

#### ARTICLE VI—REGIONAL NETWORKS

Sec. 1. Establishment of semiautonomous regional networks shall be encouraged by TRANET.

Sec. 2. The 5 members of TRANET's Advisory Board from any region may constitute themselves as the Governing Council for a regional section of TRANET, and may elect whatever officers they deem necessary.

Sec. 3. A regional network (e.g. TRANET/Latin America) shall be deemed constituted when it has been legally incorporated, and approved by the TRANET Advisory Board.

Sec. 4. A regional network is entitled to  $\frac{2}{3}$  of the membership fees collected from that region, and any additional funds designated for it by the Governing Council.

Sec. 5. Regional networks may establish whatever regional offices and staff they decide necessary.

Sec. 6. A regional network may translate and assume distribution of TRANET's quarterly and any other TRANET publications in any languages and amounts it considers appropriate to its region.

Sec. 7. Each regional network shall encourage and assist in the establishment of subregional and local A.T. networks.

#### ARTICLE VII—GOVERNANCE OF TRANET

Sec. 1. The Advisory Board shall be responsible for election of officers and general policies.

Sec. 2. The Governing Council shall be responsible for approving new programs and reviewing the progress of TRANET.

Sec. 3. The Executive Secretary shall be responsible for the daily operation of TRANET.

#### ARTICLE VIII—CHANGING THE BY-LAWS

These by-laws may be changed on the written recommendation of any three members of the Governing Council and a majority vote of the Advisory Board.



## A PEOPLES' INPUT TO UNCSTD

## (The U.N. Conference on Science and Technology for Human Development)

"Science is too important to be left to the scientists." It is also too important to be left to U.N. delegates. Science and technology affect the lives of all people. Science has brought many benefits. It has also brought many dangers. And, the benefits have not been equitably distributed.

UNCSTD (The U.N. Conference on Science and Technology for Development) gives a time frame and a mechanism for reevaluating and redirecting science and technology toward the betterment of the lives of people in all parts of the world. If we, the people, are to participate constructively in this world-wide dialogue we must start now.

It is not enough to wait, as in past U.N. Conferences, until a month or two before the official meeting to become active. National leaders have already started preparing position papers. The U.N. Secretariat has already started preparing the official Conference Documents. The people too must start now discussing the impact of science and technology on their daily lives, on their community's well being, on the resources of the planet, and on World Order.

Past U.N. Conferences have invited token representation by "the people" through selected NGOs (non-governmental organizations) which watched official delegates from nearby hotel rooms. At the U.N. Conference on Human Settlements (Vancouver, 1976) a broader spectrum of non-governmental groups participated in their own HABITAT FORUM in which people-to-people communication on important world problems became as important as the dialogue with the official delegates. The potential of the Habitat Forum was diminished by the general chaos engendered by the lack of preparatory communication among the NGOs.

For UNCSTD a broad coalition is developing to create a constructive peoples' input to (or in parallel with) the U.N. Conference. You are invited to participate.

The A.T. Resolution on the other side of this page is suggested as a core statement of our concern. Each participant is urged to endorse this general statement, to add its own addenda, and to expand on relevant portions of the basic declaration of principles.

Similarly, each group or individual participant is to develop its own activities to fit with its own local conditions and its capabilities.

One concern we hope to bring to UNCSTD is the development of community level technologies. Currently the primary motivations for R&D (research and development) are for National defense, National prestige, or to meet the wants of the affluent segments of already over-industrialized urban societies. Attention needs to be given to alternatives which meet both the basic physiological and psychological needs of people.

## WHAT YOU CAN DO

Write an editorial on a peoples' input to UNCSTD for your newsletter or other periodical (include the A.T. Resolution).

Put discussion of UNCSTD and the A.T. Resolution on the agenda of club meetings.

Coordinate an A.T. Teach-in at your local school or university.

Identify local problems of and needs for science and technology.

Develop your own position paper on science, technology and human development.

Prepare an A.T. exhibit or seminar to be held in conjunction with the regional preparatory meeting.

Urge local newspapers, radio and t.v. stations to provide news on UNCSTD.

Let others in the network know what positions you are preparing and what actions you are taking or planning.

Plan to be at the UNCSTD regional preparatory meeting and the Conference itself.

## PEOPLE TO CONTACT

Mr. Joao Frank da Costa, Secretary General, UNCSTD, Rm. 81101, United Nations, New York N.Y. 10017.

Ambassador Jean Wilkowski, U.S. Coordinator for UNCSTD, Department of State, Washington, D.C., 20520.

The Lund Letter, Research Policy Program, University of Lund, Solvegatan 8, S-223 62 Lund, Sweden.

## THE UNCSTD TIME TABLE

February 1977 to April 1978, Preparation of National Papers.

June & July 1978, Regional Preparatory Meetings.

September 1978 to June 1979, Preparation of Conference Documents by U.N. Secretariat.

August/September 1979, Convening of UNCSTD, (Place to be determined).

A TRANSNATIONAL RESOLUTION OF ALTERNATIVE/APPROPRIATE TECHNOLOGIES FOR THE U.N. CONFERENCE ON SCIENCE AND TECHNOLOGY FOR (HUMAN) DEVELOPMENT

Fully convinced that science (knowledge) and technology (know-how) are the principle tools by which large segments of humankind have obtained physical comfort and freedom from want, but

Recognizing that inappropriate technologies springing from science have led to waste of resources, environmental pollution and intolerable living conditions for many people, and

Noting with concern that both among nations and within all nations the benefits of science and technology are inequitably distributed, and

Disappointed that the U.N. and its member governments have neglected the development and promotion of "alternative appropriate technologies", and

Fearing that current inappropriate sciences and technologies have placed humankind in grave societal, environmental and physical dangers,

Appropriate technology groups and citizens in all parts of the world strongly urge the U.N., its technical agencies, and its member governments to:

Develop new policies and programs for science and technology which give greater attention to the basic needs of people,

Emphasize and support the development of technologies which: are in harmony with nature, are culturally fitting, provide meaningful employment, are low cost, are small scale, are easily maintained, and which lead to local self-reliance and the dignity of humans as well as their physical comfort.

Consciously redirect technological programs and scientific research toward improving the well being and autonomy of the lesser advantaged nations, communities and individuals.

Senator SCHMITT. Thank you, Mr. Ellis and for all of you who have summarized. The material in its entirety will be part of the record as will any other material you choose to submit in the near term.

I might just react first to one of your comments. One place where others will be represented, if they are not represented by the State Department in their discussions, will be here before this subcommittee. That is one reason we had the invitation list designed the way it was designed.

This subcommittee will certainly continue to take an active interest in the Conference. I don't know how far we will be able to take that interest or how fast. That is a question that will result largely from our analysis of the activities today.

One thought that has been developing this afternoon in my mind, is that the term appropriate or alternative technologies may be becoming misleading or not inclusive enough. I notice you have established yet another term, and I think it is clear now we are talking about a number of different types of technologies. I listed five before the previous witnesses, summarizing the consumer technology, capital intensive technology, life technologies, management technologies, and then the benefits of high technology, which are more intangible.

These technologies are, I am sure we could probably define some others, superimposed on countries with widely varying internal and external characteristics.

If you just talk about whether a country is rich or poor in certain characteristics, I think we can illustrate very simply the divergency that exists. A country may be rich or poor in labor. In resources, we find energy, we find water.

In the question of education, some developing countries have the basic infrastructure of an educational system. Nigeria, for example, has taken major steps toward educational systems. Most Latin American countries have the basic educational infrastructure upon which they can build.

On the other hand, other countries have nothing at all.

Management capabilities, which was discussed by the last panel, may relate right into the colonial days. How, for example, did the British or French or other colonial powers treat the development of an internal civil service?

We know there are vast differences in such capabilities throughout the developing world. Or what has happened since that time, in these days after the development of a viable civil service. Whether there is a seacoast or a river for transportation is another factor. If nothing else, we can start to think that there is a definable matrix upon which we can deal with concepts that are relevant in considerably greater detail than when we just talk about appropriate technology transfer.

I hope, in the minds of the people who will be working to put together the Conference, that this is a useful direction to pursue.

Now, would any of you like to comment further on getting to that next order of detail.

OK. Then I would ask, more specifically, this question for the chairman. I am sorry he isn't here to pursue it. What do we anticipate about economic conditions that will face not only the environments in which the Conference takes place, but the environment in which these next phases take place, after we leave the halls of the Conference, as the commencement speaker might say? Mr. Carey?

Mr. CAREY. Let me try, Senator.

I think the principal point I tried to make was, we are talking about a very long effort which will be necessary to meet the reasonable demands of the developing world and that bursts of technology hand-off, or abrupt and short-term scientific expeditions which peter out after a period of time won't accomplish it.

We are talking about fairly high stakes politically and economically, particularly from the viewpoint of the developing world.

Those stakes happen to collide in many respects with our own interests. The so-called new international economic order is a backdrop which does represent a consensus, whether we like it or not, among the developing countries.

It is clear that their mind is set, and will, I think, prevail over the long pull. That declaration and the assumptions behind it are problematical for the advanced economies, only a few of which are in an exuberant state of growth. We are not in that group. The United States has the most advanced economy of all in terms of scale, at least. We are, I think, facing a real predicament in that unless we can establish a continuing stable political consensus to underwrite developments through science, and particularly through technology, we are going to have a rotten time of it and we won't do well.

This is why I have argued that the basic precondition for the U.S. posture, going into this conference and beyond, I agree with Mr. Stein and others on this, we have to think beyond it, if we do not have a strong political consensus (and we have heard comments here this

afternoon that indicate we certainly don't have it now), then we are going to have a very bad time.

It seems to me that for a good many reasons, including the issues we have been talking about today, our posture over the next decade toward the developing countries will require us to get our economy moving, to create the innovation, create the jobs and markets which will cushion any policy approach, any initiatives that we undertake, to assist the developing countries to a better economic future, which is what they want.

I think that if we disassociate the slumping on-and-off again state of the American economy, and the poor condition of industrial innovation from a diplomatic posture toward the developing world, we will have made a very serious error.

This is why I stress this one point perhaps more than any other that I have given in my testimony. These matters go together and they must not be separated. I think this is a concern for Congress as it looks at tax policy, as it looks at budget policy, as it confronts the problem of the adverse balance-of-payments situation.

It is more complicated than the oil importation question, that tends to dominate the perception of the problem, but it is not the whole story.

We are not moving the innovation and scientific discovery through application to jobs, and market, and change and growth.

We have to have all of those things in order to fulfill commitments that we may make next year to developing countries.

MR. NICHOLS. I am not entirely sure I understand exactly how you meant your question about economic conditions, because in some ways it seems to me political conditions are more important.

SENATOR SCHMITT. I am not sure they are unrelated.

MR. NICHOLS. That is true. Let me talk to the economic point and say why in one limited sense I don't think it is as important.

To begin with, I think most observers would agree that research and development as a component of foreign assistance can be highly cost effective. That is, a comparatively small amount of money can trigger a lot of payoff.

Second, I think it is fairly well established that, when you look at the sum total of the financing for development projects within any given LDC, 80 to 90 percent of the funding comes internally and only 10 to 20 percent comes externally. So in any event, changes in the U.S. outright aid, the billion dollars or so that the President suggested he might try to double or triple in 4 to 6 years, will not make an enormous difference.

Third, in terms of the economic demands on us such as the new international economic order, or the law of the seas negotiations, we don't have to agree. There is nothing forcing us to agree immediately unless we decide that the agreement is in our interests. So if economic conditions are sluggish, we may have a further reason for disagreeing.

Furthermore, I would argue, as I believe Bill Carey was arguing, that revived domestic research and development may be more important on balance to keep our own economy going. Such efforts surely would be less controversial at home, even if they were more controver-

sial abroad by making the United States a more effective trading competitor.

Senator SCHMITT. The concern really has to do with the broad world economic condition which is not independent of ours, but it is still a much broader issue. There exists a \$140 billion current account deficit at the present time in the various countries we are talking about.

These are things which have tremendous unknown consequences over the next 2 to 5 to 10 years.

Mr. NICHOLS. Absolutely.

Senator SCHMITT. This is the environment in which this conference is taking place. We just don't know the consequences. Some of those consequences could be alleviated by the policies of this country.

If we were clearly going to get control of our energy situation in this country, that has a lot to do with the attitude and the direction in which many other countries start to move, as long as we clearly don't have our own house in order in that area, then it leaves a great deal of uncertainty and a great deal of economic uncertainty particularly in the rest of the world.

The fluidity of money within this world of ours is tremendous and causing a great deal of uncertainty. So that is what Senator Stevenson and I are both very much concerned about.

I don't think, though that there is an answer. I was just wondering if you share, as I know Mr. Carey has indicated he does, the concern that we have.

Mr. NICHOLS. Absolutely.

Mr. ELLIS. I don't really disagree, but it does seem to me that the U.S. preparations for this Conference is making too much of the North/South conflict, rather than looking for the possibilities of cooperation.

I think there is much more understanding in the Third World of the problems we face than we are giving them credit for.

As I noted in my paper, the U.N. Development Institute states clearly that the problems of the industrial countries are far greater than their own problems.

The same thing is true in the Latin American paper from the Foundation Bariloche. It is by an outstanding bunch of scientists and scholars. They are saying, the Third World could do its own development without foreign aid. They should consider the internal growth of themselves; built on internal self-reliance.

I think the concept of the self-reliance that is developing is one we should work on and develop rather than look at this conflict of them trying to take away our technology or them trying to demand more from us, because there is a growing spirit of cooperation.

I found this in the groups at Geneva and Vienna. They may have been selected for that particular purpose, I don't know, but confrontation did not come up in either of those meetings I just returned from, as much as it has in our discussions here.

Senator SCHMITT. There tends to be some crosscurrents and it depends upon the governmental representations you are dealing with. Certainly the "Group of 77" is moving in one direction.

Maybe the academic world in these countries in nongovernmental areas have been moving another. That is one of the problems that the people organizing the Conference have to deal with.

Mr. ELLIS. Many of the people at these conferences were ministers of planning or other high government officials.

I didn't find the sense of conflict that I find it in our own preparations.

I think we should look for those places where they are looking for cooperation rather than being so afraid as labor is that they will take our jobs, or as management is that they will demand our technology. They are not that unreasonable.

If you read the papers of the 77 group, they are all for indigenous growth. We should work very hard to find mechanisms to help them get their own economic growth.

Senator SCHMITT. I hope you are correct.

Mr. Carey, the five presidents or past presidents of the AAAS, expressed concern for excessive emphasis on technology transfer from the industrial sector of this country.

The term nonproprietary science and technology apparently was used in that letter.

Would you care to try to draw a very general and very brief distinction between the two types of technology?

Mr. CAREY. The statement of five presidents arose in the wake of the very large meeting which Secretary Kissinger arranged last year with wide participation of the business and industrial community to begin to open up discussions leading to this conference.

As we reviewed the record of that meeting, it struck us forcefully that the dialog was concentrated very, very heavily in the direction of the movement of U.S. technology in the developing countries through multinational corporations.

This was fundamentally proprietary technology. The matter agitated AAAS to the point where we did convene a meeting of five presidents—past presidents, and the current president of AAAS, because we felt that with a change of administration and the arrival of Secretary Vance, it was important to alert the Secretary to what we felt was a mistaken emphasis which could get so imbedded in the planning of the State Department for the Conference as to diminish and push into the background the basic human needs problems of these developing societies, and to greatly overestimate and oversimplify the business of technology transfer.

This is one of the great contemporary mysteries. How do you manage a technology transfer effectively? What are the processes for getting it properly situated, transferred, and assimilated?

Nobody, Senator, and Mr. Chairman, has real answers to those problems. There has been a great deal of groping. We have not done this well within the United States itself, although we have tried. We have not succeeded very well in doing it internationally and to see the State Department, as it seemed to us at that point, hooked on the magic of proprietary technology transfer, was shocking.

And we flew a message to Secretary-Designate Vance urging him not, in effect, to be taken in by it but to keep his options open and look at the other side of the problem. There is a vast public technology available in the United States. Some of it is medical technology, to which we have referred. There is agricultural technology. There is technology to clean up water. There is a great variety of technology which is not in the proprietary area. To ignore it is unthinkable. There

is a whole field of long-term investment in building capacity for the developing countries through education, through training, through institutes to give them a foundation on which to build this house of development rather than indiscriminately with technology through the market system, through the trade system. It seemed to us this would create and legitimize expectations which could not be carried through and fulfilled and which would implant technologies in very limited sectors of these developing countries which would have few beneficial side effects in raising the total capacity—the general capacity of the country to improve the human conditions—and finally, that it would be potentially disruptive of village economies and rural societies.

We felt that some of these points ought to be reflected upon very, very carefully in designing a U.S. posture and not go into the conference with a simplified solution. There is a long track record—a very long track record—of loose diplomacy practiced by the United States Government over the past two decades in terms of playing a science and technology card in international meetings and dealings, particularly with developing countries.

If you can't solve the really painful policy relation problems with these countries, you can always put down a card that says we will have a bilateral agreement of scientific cooperation. If we tried to find these agreements today in government and look at the state of those agreements and the followthrough on the implementation, we would all be quite embarrassed. This is what we were trying to say to Secretary Vance.

Senator Schmitt. Thank you.

I have three questions, now, if you gentlemen would want to submit to the subcommittee some thoughts for the record. Mr. Stein and Mr. Ellis both referred to some concern about others and how they communicate within this process. I wonder if you would care to make some suggestions to the subcommittee regarding the forum, beyond our own activities, for governmental communication.

You have mentioned some in your paper. If you feel that that is adequate, fine. If you have some other thoughts, we would appreciate having that.

Also, Mr. Carey, and I believe, Mr. Nichols, you would probably have some thoughts—this problem in which you are trying to anticipate what would happen if we centralize—if we overcentralize in the developing countries. That is, is technology going to inevitably lead us towards the concentration of people in one place; urbanization?

We had some discussion of that earlier today. I think it would be useful for the committee to have an expansion of thoughts on those problems from your experience and perspective.

If you want to submit that for the record, we would appreciate it.

Mr. Chairman, I guess those are the two major ones I wanted to cover.

Thank you, gentlemen for your contribution. I think the Chairman has some more questions.

Senator Stevenson. Gentlemen, I apologize for my absence. I had to go to the Senate floor. Therefore, I don't know what you have covered.

Mr. CAREY. We will excuse you from questions.

Senator STEVENSON. Oh, would you like to get out of here? I thought you were going to start questioning me.

Well, the staff has suggested one question. Do you foresee a need for additional incentives or assurance programs, or guarantees, and perhaps changes in the antitrust laws, in order to facilitate the transfer of technology to the LDC's and investment by the private sector?

Mr. ELLIS. I would call for just exactly the opposite. I think one of the problems we have had, is that we have been trying to assure from this end that anyone that goes into the Third World with any technology they want is insured from loss.

I think if we make it clear that there is a risk, the people will consider whether the technologies they take in fits the market and fits the conditions of that country.

We need to really reevaluate all of our policies to see to what extent they are pushing in appropriate technologies into the Third World rather than helping the Third World develop their own capacity to design technologies they want, and to choose the technology that best fits their situation. I think guarantees for uncontrolled technology transfer is the wrong way to go.

Senator STEVENSON. Any other responses to that question?

Mr. CAREY. Senator, I don't think the barriers to international technology transfer are so much in terms of restraints of antitrust. I think that the situation, however, is very different relative to U.S. technological innovation where from every reading that I get, there is a great deal of money being spent—over \$40 billion on government and private research and development. I have heard remarks here today which I take to mean that we should be investing more in research and development.

I think the question is more complicated; the problems are more complicated. It goes to the quality of the R. & D. that we are doing. How we are allocating the \$40 billion plus that we are now putting into research and development, and particularly in the private sector, where testimony is emphatic from American industry that they are not putting the money into innovation—technological innovation, but are putting it into defensive research and development—into microchange, not macrochange.

What you have here is a sideways circular movement in the use of research and development dollars in the U.S. economy. It doesn't bite. There is very little risk-taking—there is less risk-taking in American technological industry today probably than at any time in the past quarter century.

This promises a very limited, if not dark future, it seems to me, for American competitiveness and job creation to cushion the problems of job loss due to technology transfer and overseas investment. I think that we have got to look very carefully, Senator, at the constraints and the circumstances which have brought this environment to pass, and it is not going to be cured by shoveling more dollars into R. & D., because those dollars are not generating innovation.

There is something very wrong in the internal practices of industry, and it may not be just industry's fault. There may be governmental reasons and constraints which are contributing to uncertainty. If antitrust is one of the impediments which, for example, keeps firms in the energy field from cooperating, from pooling, from collaborating their know-how, then we may need some relief there.



One of the things that I do, is to lead an American team work with the Soviets under the Nixon-Brezhnev agreement on management and planning of research and development. The Russians will be in perfectly sincere terms, "But it must be true that government and industry exchange ideas and goals in this research and development?"

I say: "No, that is not true."

Then the next question is: "Well, then firms within an industry do collaborate." I say "if they do, they will go to jail." And this astounds our friends on the other side. So I think the anti-trust question is the proper question, but it needs to be considered in relation to very poor performance of American industry today technological innovation.

Senator STEVENSON. I think I heard Mr. Ellis suggest a number ago that the proposals I raised for investment incentives were unnecessary and the market should be left to allocate the resources. You are to be suggesting the market at the moment is not doing a very good job, at least in the private sector, of allocating R. & D. resources.

Now, without knowing much about all of that, I agree with you. Having traveled a good deal in the world, I am a little surprised by your suggestion, if I heard it properly.

I see large plants, hotels and urbanization in many countries. While the Government intervenes in this development, it is for reasons of prestige or pride. Everybody wants to have airlines now. Once in a while, there is a country in which the market isn't permitted to make such decisions. In Tanzania, for example, they seek to preserve the natural environment. The market does not allocate in this country. There are no luxury hotels.

Mr. ELLIS. It may not be the market as we think of it. Very often in the Federal Government guarantee someone to go in and set up a coffee plantation. That company buys up all the land. The people on the land, therefore, cannot grow food. They are growing coffee. They are out of jobs because they bring in high technology to pick the coffee bean.

The people go to the city where there are no jobs, primarily because we have guaranteed that that coffee grower from the United States is going to lose nothing, because we are giving him an insurance.

These are the kind of things we have to examine. There are a number of papers written on the idea that the best thing that the Third World could do, or that we could do for the Third World, would be to prevent any technology transfer, so that the people in those countries themselves would have to develop their own technological capabilities.

The concern that I have is that we in the United States sit here and decide what technology should be there.

The labor representative spoke earlier today about, transferring jobs, paying very little, giving no vacations, taking women out of their homes, and doing tremendous damage to their culture. The kind of programs we should have is to go in and help the people, particularly the people at the village level, to determine and develop their own technology.

Development is a state of mind not a state of technology. Every person is using some kind of technology. What we should be trying

to do is upgrade those technologies which are being used for the poorer people.

If you will remember, in "The Ugly American," one great technological change was to take a broom that had a 1-foot broom handle on it and put a 3-foot handle on it so the woman could stand up when she swept the floor.

These kinds of very simple technologies are very important, but so are technologies in which they use labor properly. For instance, in India there is a big push to develop a labor-intensive weaving industry. In Tanzania they were bringing in a weaving technology costing \$44,000 per workplace. That is a lot of money to put down for a workplace with Tanzanian funds.

The Indian technologies can be created for something like \$1,000 to \$3,000 per workplace. This is more the type of technology which the Tanzanians should be choosing, and yet the other technology was essentially there because we were giving guarantees and loans so it could come in. These are the policies which have to be reexamined.

Senator STEVENSON. Well, I am uncertain as to how you reach that goal. We seem to be saying that the market can't be trusted, that the developing countries should make the decisions. But, we have to help them make the right decisions, and we are not making the right decisions ourselves.

How you sort all that out and come up with a process that achieves your obvious objectives, I don't know. But, that is why we are all here.

Mr. ELLIS. I suggested in my paper one type of program that the Peace Corps is talking about. That is to have some of its volunteers in the villages of the Third World to be experts on energy. They would do an energy study of the village. They would say, here is the energy they have. Here is the way they use it. What new sources of energy could be used in this village? It might be solar, it might be biogas, it might be hydro. Now, by giving the people in the village the opportunity to think through their needs and by introducing them to alternative technologies which they are not using—for instance, in this case, energy—we might do it in health, we might do it in other areas, we are helping those people to be able to choose the technologies they want. These are the kinds of things I think we could do.

We might do this in industry. Industry might very well set up panels to help the Third World when they have problems, to think through the problems and select the technologies they need.

The choices would be left to them. We would not try to make it here in the National Academy or in DOE or some place. We would give them the basic techniques of thinking through their own problems.

Senator STEVENSON. One more question.

Are these things that the United States should be doing now in preparation for the Conference, and things which would help if followed up after the Conference?

Mr. STEIN. I think there might be several. One is to give more evidence than we have to now, that we are going to follow up on those conferences which have already taken place.

Specifically, the U.N. Settlements Conference held in 1976, and the U.N. Water Conference in March of this year. Both have received, I think, very little in the way of followup from the United States.

In the latter case, there is some indication that now that the General Assembly with U.S. support has approved a decade of clean water, the idea of clean water is something that we will work a little harder on and devote more attention to.

I think that is one way to give some evidence that we recognize that U.N. Conferences do have followup.

Second, it might be a little premature to do it right now, but in our public statements about the Conference, we should say that we expect that either the same group which has now been set up to prepare for the Conference will continue or that there will be an appropriate group formed ahead of time in order to make sure that the Conference does receive some structural implementation within the Government itself.

And third, given budget cycles, it is not premature at all, to begin to plan for some of the concrete measures which the United States will announce at the Conference, and which will have to be acted upon in the period following the Conference.

Senator STEVENSON. Mr. Nichols, did you have something to add?

Mr. NICHOLS. You raised a very large question, as you know, Mr. Chairman. I would illustrate an answer, perhaps, with three categories.

First, I agree completely with my colleague on the panel, Mr. Stein, that the Conference provides an excuse, so to speak, within a reasonable time frame from now, 18 months, to really think through more coherently the ways in which science and technology interact with foreign policy. That is a very long-term issue that has nothing to do with a 2-week meeting in the middle of 1979. I agree completely that the Conference is, as said earlier this afternoon, a commencement rather than a culmination. The followup task that I have just mentioned—how does science and technology interact with foreign policy, both in the diplomatic and economic senses—is a big question.

The second followup task relates to a whole set of internal governmental, organizational, and financial issues. We don't coordinate our international programs very well. We certainly don't manage and coordinate internationally relevant R. & D. very well. Mr. Kissinger, among others, over a decade or so made a variety of initiatives which haven't been followed up mainly because there was not established responsibility for the followup.

The third set of followup issues has to do with what we are hearing from the developing countries. It is clear that the executive branch and Congress have not looked intensively at the whole new range of central points being made in the last year or two by the most sophisticated spokesmen for the Third World. At the Conference and after it, we have to respond to those points one way or the other and not just in a passive sense.

Senator STEVENSON. Why did you say in the last year or two?

Mr. NICHOLS. I think the terms of the debate have changed. That is all I was hinting at. In the immediate aftermath of the OPEC price rise and as a result of the strength and euphoria of the Group of 77, the debate was in such shocking and hostile terms that you couldn't even have a cup of coffee with some representatives of LDC's. But in the last year or two there are much more sophisticated statements being made. As our panelist, Dr. Ellis points out, these recent

statements are usually more reasonable. There are still some insistently strident demands such as in The Law of the Sea negotiations and other contexts. But I think in the last year or two the terms of debate have gotten so much more sophisticated that it is possible to look at the situation in a much more cooperative and collaborative way.

Senator STEVENSON. That is encouraging.

Mr. Carey, you can go home.

Mr. CAREY. I wasn't all that anxious, Senator. I am enjoying it.

Senator STEVENSON. I apologize again for being absent for part of your testimony. I am the loser, but I will read your statements, and I am very grateful to you for the help. From what I have seen and heard, it's been a very productive part of this lengthy hearing, and we may have some additional questions.

If so, we will get in touch with you. Thank you.

With that the hearing is adjourned.

[Whereupon, at 5 p.m., the hearing was adjourned.]



## ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

DEPARTMENT OF STATE,  
Washington, D.C., January 9, 1978.

### OFFICE OF THE U.S. COORDINATOR FOR THE UN CONFERENCE ON SCIENCE & TECHNOLOGY FOR DEVELOPMENT

HON. ADLAI E. STEVENSON,  
U.S. Senate,  
Washington, D.C.

DEAR SENATOR STEVENSON: This is to request that the following information be included as addenda to the official Record of the December 15, 1977 Hearings on U.S. Preparations for the 1979 Conference on Science and Technology.

On page 140, lines 4-7 of the draft transcript, Mr. Benjamin Sharmin of the International Association of Machinists stated he was not aware of any labor participation in U.S. preparations. It should be noted for the Record that Mr. Lane Kirkland of the AFL-CIO is a member of the Informal Steering Committee which serves in an advisory capacity to Conference preparations. Mr. Kirkland was unable to attend the initial meeting of the Steering Committee but has been kept informed of activities related to the Conference on our preparations. He has also been assured of our interest in having labor's views and active participation. Additionally, two representatives from AFL-CIO were invited to participate on Study Group Panels set up by the National Research Council (NRC). The NRC is under contract to our office to provide a background study of U.S. resources and capabilities which could be applied to developing countries. Unfortunately, neither was able to attend the first meetings of the Panel. It is hoped they will participate in subsequent sessions.

The other item for inclusion in the Record is submitted in response to a suggestion from your staff for any supplemental material related to Conference preparations. In November of last year, the Bureau of Cultural Affairs of the Department of State, under a leadership grant program, brought representatives from eighteen countries, seventeen of which were developing countries, to visit American institutions in the science and technology policy fields. While here, they were asked to discuss their preparations and hopes for the 1979 Conference. The attached document, "Notes from a Meeting with a Group of Distinguished Visiting Scientists," captures many of their impressions about issues related to technology transfer and about objectives and opportunities for the 1979 Conference. I think you will find the document a very interesting and candid statement about expectations of developing countries for UNCTSD and an appropriate supplement to the Hearings by the Subcommittee.

Sincerely,

JEAN M. WILKOWSKI,  
Ambassador, U.S. Coordinator.

P.S. Since dictating the above, you should know that Idz Jaeger of the AFL-CIO participated very actively in the NRC Panel on Industrialization, which I also attended at MIT in Boston on January 6.

### SOME FOREIGN VIEWS ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

#### NOTES FROM A MEETING WITH A GROUP OF DISTINGUISHED VISITING SCIENTISTS

GEORGE WASHINGTON UNIVERSITY, DECEMBER 2, 1977

##### Background

The nineteen countries represented were developing countries with the exception of Switzerland. Socialist countries were Romania and Hungary. The group completed one month's observation of the U.S. science and technology establishment at the invitation of State's Cultural Affairs Bureau.

With only a little prompting from the USG audience, the group talked for four and a half hours about their views on developmental science and technology

in general and the outlook for the UN Conference on Science and Technology in particular. The views were thoughtful and mostly country specific. There were a surprising number of positive suggestions for action by the U.S. and others.

In groupings of views under thematic headings below, the speaker is listed by country. A list of country representatives is attached.

#### *Development Priorities for Application of S & T*

We need help in exploiting our natural resources. We don't even know what we've got. Also we need help in food processing technology and agriculturally-based small industry. (Afghanistan)

We need simple but improved minerals processing technology. We lack techniques to manage the agriculture of our rich slope on the edge of the jungle. (Peru)

We have 100% literacy and a small population, but we have persistent 20% unemployment, mostly unskilled manpower. Because we have a large refinery capacity, we are actually searching for energy intensive, small, secondary industry. (Trinidad)

Our priorities are food and housing, but the biggest problem is urban concentration which complicates everything. We need technologies for settlement and population redistribution and we need them urgently. (Indonesia)

We are working along a number of fronts with our science and technology. We are trying to recover raw materials used in production, develop new energy sources, extend and deepen agriculture and food, modernize transport, communications, and health care, broaden multilateral technical communication. (Romania)

#### *US Role in Technology Transfer*

U.S. technology is very diversified; too diversified. There is no specific orientation that would allow concentration on our development problems. Some of the universities have courses on development, and that is a good start. What is really needed is technologically oriented development centers in American universities with involvement also of American industry. This would establish a focus for practical study of technology and development and would be some place where our students could go to study the application of the technology they have learned in the U.S. If our students don't know how to use at home the technology they learn here, then they will not want to stay on at home. There is no technology supporting base at home and it is frustrating for the newly-trained technocrat. (Afghanistan)

AID put in rural power systems but the poor farmers could not afford the electric rates. U.S. experts sometimes don't know how to apply or adopt their expertise to the conditions they find. A U.S.-built highway on a rain-swept mountain slope was washed away three times. Yet there is no problem in the developing world that cannot be solved by application of U.S. science and technology. The trick is to get the problems in order and then bring to bear the solving technologies.

U.S. technological achievements and the resulting U.S. life style create a time bomb of social inequity in the less fortunate world. The U.S. must share its technological wealth. For the more than two decades since WW II, U.S. business and the MNC's have been transferring technology, but this has not touched the lives of 95% of the people in the receiving countries. The U.S. technological wealth which others want to share is not the substance of the technology. The developing countries do not want technology transfer. It is knowledge, technological knowhow, and a perception of the true nature of things that is wanted. The U.S. and other developed countries should join with the middle income countries to form consortia for assistance to the lesser developed countries. (Trinidad)

We have trained many countrymen in S&T in the United States, but they bring back knowledge that cannot be applied in our undeveloped state. Our students need to know about the application of S&T to development problems while they are still in the U.S. and can interact with U.S. technology centers and U.S. industry. They need to learn where in the U.S. they can obtain the technical information which they find they need only after they have returned home. After they get back home, it is too late to learn these things. (Ghana)

The U.S. must somehow move off the position that the U.S. Government cannot advise private industry to participate in international projects. We recognize the need for joint ventures and patent protection for technology. The thousands of registrations in the U.S. patent office represent an important, unex-

exploited technological treasure. U.S. corporations should be advised to analyze these for joint venture possibilities. (Romania)

The U.S. has recognized the value of training our people so that we will be better able to handle technology. The U.S. has not done a lot. It is a big problem but the U.S. at least has done something. Now others and our own Government must do more. In the future, the U.S. should not spend 80% of its training money in the U.S. It should spend some money for training in third countries. We could learn a lot in some middle income countries. (Zaire)

U.S. transfers very little technology in its projects. They are 70% administration, 20% training and only 10% equipment. We need more equipment, but we also want training to develop the skills to operate the equipment. (Indonesia)

We do not want the U.S. to tell us what it will do for us based on what the U.S. does best—thinks is best for us. We should know what will help the most. (Afghanistan)

### *Appropriate Technology*

We need simple technologies. We need them, not because they are cheaper, but we must move ahead and we have no time to learn and to train for the use of advanced technologies. Also it is not good to develop by jumping too many technology steps at once. Yet even the simple technologies must be of a standard which will permit us to produce an export quality. (Afghanistan)

What is needed is knowledge about technological alternatives. We have limited rainfall, not drought, so the best answer is not expensive big dams but basic research in crop genetics which will produce varieties suitable for limited rainfall. There is also a big problem in getting the uneducated poor to understand that sometimes advanced technologies are appropriate to apply in meeting their needs. Use of satellite TV for education has to overcome cultural alienation. Weather technology brought warning of the Indian typhoon, but the weather information could not be converted into actions which would protect the population from the storm. (Peru)

U.S. science and technology is losing its position as the leader to be followed, because U.S. science and technology is used to support an economy which wastes resources. Developing countries need S&T that can be applied to conserve resources needed to produce for export. It is only through export that the developing world can earn a surplus to invest in raising living standards. There is too little capacity for research in the developing world and too much of this builds stockpiles of research results which cannot be applied to production. (Korea)

Some says that it is not technology but technological training that the developing countries need. They say that when its people are trained to make intelligent decisions, the developing country can choose appropriate technologies. This may be true for others, but for us it is not technological training but the technology itself that is needed. Although we are still very much a developing country, we have the third largest body of trained scientists in the world. We can put the imported technology to work, and we have no time to spare from the struggle against poverty to become better educated in technological choice. You in America must choose the technologies you send because you know the characteristics of your technology better than we do. (India)

The MNCs have got to develop appropriate technology if the LDCs are going to get what they need. Yet why should the MNCs?—How would it pay them? A way must be found. (Trinidad)

Technology transfer without competence is useless. We don't need technologies as such, we need only those technologies that are appropriate to our level of competence. If the developed countries really want to help us, they should help raise our technical competence. (Afghanistan)

No technology can be used without information. Technical information includes technical experience and know-how. Even low technology needs know-how information. Appropriate technology information should be stored somewhere in the U.S. where it can be reached by LDCs. (Ghana)

Information about a technology should reveal the technology's appropriateness. Technical information should include an analysis or assessment of the technology's implications for developing countries. (Romania)

### *UN Conference*

The UN agencies themselves are not doing the job of organizing for the conference. They are pushing the project responsibility on the LDCs. The so-called UN "experts" sent out to help with preparations are usually LDC dropouts. (Afghanistan)



We are confused about the purpose of UNCSTD. It can't deal with everything, with all the LDC problems, but it seems to be trying. Is it a conference about population, health and food all at once? We, and most other LDC's, are not concerned with environment as a major problem because we do not have the pollution of industrialization. Education is our major concern. What is the major concern of the U.S.? We want to know what you are going to bring up so that we can prepare for that. Then we will be meeting you on common ground and not wasting time. Everybody seems to be beating around the bush. (Zambia)

Even if the conference were to last two years, how could you explore all these issues of development. The conference should discuss how to transfer technology and not what technology to transfer. (Afghanistan)

What kind of a conference is it when we coordinate at subregional, regional and international levels to determine five chosen areas of subjects? What happens to our national priorities if others have different priorities of their own? Maybe the five final priorities aren't any of our and we have a conference that doesn't matter for us. (Tanzania)

The developed world expects us to develop a common position so they will know how to deal with us. Impossible! (Trinidad)

The conference must result in a technology transfer charter; a declaration of technological development. We need a symbol of world concern and agreement. (Korea)

The conference can make important contributions to world progress if it gives rise to new things and does not just review the old. Science and technology must be treated as part both of economic and social considerations. The conference must dictate new tasks for the U.N. system. It should provide for world environment standards because we are environmentally one world, for an international program to map the world's resources so we can plan their use, and for a common language for technology and technology transfer. The U.S. views are so important that we hope it will attend our UNCSTD regional meeting in Bucharest. (Romania)

The regional meetings become the property of the strongest country in the region. The meetings for UNCSTD should not be held on a regional basis. They should be held among countries at the same level of technological development and with similar problems. (Afghanistan)

Science and technology for what? For development? That is an economic term \* \* \* For people, for the quality of life, is better. For the pursuit of happiness \* \* \* The United Nations Conference on Science and Technology for the Pursuit of Happiness. Not the GNP, but the Gross National Happiness. (Mauritius)

The UN Conference is not just for less developed countries to seek aid from more developed countries. It is a conference about development, and all countries are developing. The developed countries are not stagnant. They cannot sit and wait for the developing countries to catch up. The conference should consider the problems for more developed countries caused by successful application of technology to development of less developed countries. The developing countries are taking over economic activities and raw material bases. What is the economic future for developed countries? (Switzerland)

## TECHNOLOGY, AND DEVELOPMENT

DECEMBER 2, 1977

*Hosts.*—John M. Logsdon, Graduate Program in Science, Technology, and Public Policy, George Washington University, Dean B. Mahin, Project Coordinator, Institute of International Education.

*Moderators.*—Henry R. Nau, Graduate Program in Science, Technology, and Public Policy, George Washington University. H. Guyford Stever, Director, National Research Council Study for the UN Conference on Science and Technology for Development.

## PARTICIPANTS

*Afghanistan.*—Dr. Zarjan Baha, Dean, Faculty of Engineering, Kabul University.

*Afghanistan.*—Mr. Abdul Karzay, Director General of Evaluation & Assessment Planning Department, Ministry of Mines, and Industry.

*Benin (Formerly Dahomey).*—Mr. Tadjou Bello, Director of Studies and Planning, Ministry of Rural Development and Cooperative Action.

*Botswana.*—Modiri J. Mbankanye, Director, Botswana Enterprises, Development Unit.

*Egypt.*—Dr. Mohamed Baha-Elron Fayed, Secretary-General Academy of Scientific Research and Technology.

*Ghana.*—Dr. Albert Nee Tackie, Executive Chairman, Council for Scientific and Industrial Research.

*Hungary.*—Dr. Karoly Fucker, (pronounced Foker), Deputy Head, Department in State Office of Technical Development.

*India.*—Dr. Ramachandra Damodhar Deshpande, Director, Department of Science and Technology.

*Indonesia.*—Dr. Harsono Wirjosumarto, Professor of Metallurgy, Department of Mechanical Engineering, Institute of Technology, Bandung; Vice Director, Development Technology Center, Institute of Technology, Bandung.

*Korea.*—Mr. Shin Nan-Kyo, Deputy Assistant Minister for Policy and Planning, Ministry of Science and Technology.

*Mauritius.*—Dr. Soodursun Jugessur, Chief, Department of Physics and Electronic Engineering, University of Mauritius.

*Norway.*—Mr Erling Ejlend, Secretary General, Main Committee for Norwegian Research.

*Peru.*—Mr. Alberto Giesecke Matto, President, Inter-American Commission of Geophysics; Head, Peruvian Geophysical Institute; Director, Regional Seismological Center for South America.

*Romania.*—Dr. Ion Manzatu, Special Counselor, National Council of Science and Technology.

*Singapore.*—Prof. Koh Lip Lin, Coordinator, Physical Science Program, and Associate Professor of Chemistry, Nanyang University.

*Switzerland.*—Dr. Peter Flubacher, Chief, Section for General Research, Office of Science and Research, Swiss Federal Department of the Interior.

*Tanzania.*—Mr. Peter Innocent Mwombela, Acting Executive Secretary, National Scientific Research Council.

*Trinidad.*—Mr. Hollis R. Charles, Director, Caribbean Industrial Research Institute.

*Zaire.*—Mr. Mikobi Mingashanga, Director of Administration, Ministry of Planning.

THE PERMANENT REPRESENTATIVE OF AUSTRIA TO THE UNITED NATIONS,

*New York, December 13, 1977.*

HON. ADLAI E. STEVENSON,

*Chairman of the Subcommittee on Science, Technology and Space, U.S. Senate, Washington, D.C.*

DEAR SENATOR STEVENSON. In your letter of 21 November 1977 you were kind enough to invite me to testify at hearings to be conducted by the Subcommittee on Science, Technology and Space concerning preparation for the 1979 United Nations Conference on Science and Technology for Development.

I had accepted this invitation with greatest pleasure and was looking forward to a discussion with the distinguished participants.

Unexpected developments in the framework of the United Nations, however, prevent my participation: The main reason is the fact that due to unforeseen circumstances further meetings of the Economic and Financial Committee whose chairman I am had to be scheduled for this week including Thursday, 15 December, in order to dispense with a number of important items of business relating, i.e. to the general framework of negotiations between industrialized and developing countries.

You will understand that in view of these developments my presence at United Nations Headquarters in New York is urgently required and I have, therefore, to regretfully apologize for not being able to testify in person. I have sent copies of my testimony to Dr. Maxwell.

Hoping that my inability to participate in the hearings will not cause any inconvenience and looking forward to a further opportunity to be of assistance to yourself and your Committee, I remain

Very sincerely yours,

PETER JANICOWITSOFF,

*Permanent Representative of Austria to the United Nations.*

*Question No. 1. What is the historical basis for establishing another U.N. Science/Technology Conference?*

The historical basis for the UNCSTD, like most other major UN Conferences, is to be found in the substance of the problem: the developing countries feel that the present world economic order does not give them a fair deal, and that a new order has to be instituted in its place through a process of intergovernmental negotiations. A central place in this new order is given to science and technology. The crux of the LDC position is that: (a) their basic scientific and technological infrastructures are far too weak to underpin their development aspirations; (b) the international legal and economic regime governing the transfer of technology to them is also not geared to their development needs.

(a) On the inadequacy of infrastructures one need only cite a few indicators: about 95% of world's research and development expenditure is undertaken by what are known as the developed countries (much of which is geared to defense/military needs or to the strengthening of competitive power); only a minuscule part of the effort is directed at solving the development problems of LDCs as such; based on OECD data). Again, for example, in 1970 there were on an average of about 6 engineers and scientists for 10,000 population for 8 African developing countries for which were available, compared with 22 for Asia (including China), and 69 for Latin America; this contrasts with a figure of 22 per 10,000 developed market economies. (UN, UNESCO, ILO and UNCTAD statistical sources).

(b) On the question of the international framework, LDCs have felt that technology is simply not available especially proprietary technology; where available it is extremely costly; even when they can pay for it—often at exorbitantly expensive borrowed funds—they find that the terms and conditions attached to these technologies are onerous and restrictive. One example is the widespread use of restrictions on exports imposed by technology suppliers on technology buyers. A large part of proprietary technology transferred is through transnational corporations who, the LDCs feel, operate with their own global objectives without sufficient regard to the development objectives of LDCs, and this often at the expense of balanced development, which would reduce disparities between and within countries.

In the early 1960s, during the United Nations First Development Decade, there was an appointment about the slow rates of growth in the developing world, plus a conviction that advances in science and technology could be effective in promoting a rapid socio-economic growth in developing countries, led to the convening in 1963 of the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas. Although the Conference resulted in a useful exchange of scientific and technological information, little of this was of practical relevance to the particular social settings in which development was either needed or taking place.

Yet the Conference did leave an important institutional legacy: the Advisory Committee on the Application of Science and Technology to Development (ACAST). This group of independent experts in co-operation with concerned United Nations bodies and agencies subsequently drew up a World Plan of Action which acknowledged that investment in science and technology can yield effective results only when applied on a vastly greater scale than current programmes directed towards development. The Plan also recognized that whether technologies are acquired through the evolution of endogenous capabilities or through their transfer from developed nations, either way, both are fundamental to development.

Further, it was suggested that in redressing international inequalities, developed nations should divert a greater proportion of their financial resources from military spending towards socio-economic development. At the same time, it was equally suggested that developing countries should make every possible effort to initiate or evolve their own forms of scientific and technological capability with the ultimate goal of greater, if not entire, self-reliance. To that end, an endogenous capacity in science and technology, plus a capacity for their critical assessment was the major premise, and indeed one of the essential goals, of the World Plan of Action.

The International Development Strategy for the Second United Nations Development Decade stressed that substantial contributions of funds and a determined mobilization of efforts were prerequisites for any development based on science and technology. The Strategy to implement the goals of the Second Development

Decade determined that substantial supplemental funds would have to be obtained not only from the developed but also from the developing countries themselves.

Responding to the need to oversee and to co-ordinate the various scientific and technological activities of its whole system, the United Nations created in 1973 a Committee on Science and Technology for Development (CSTD). A subsidiary body of the Economic and Social Council, its purpose was to instill previously lacking political will into the process of scientific and technological development.

In August 1974, at its fifty-seventh session, the Economic and Social Council, in its resolution 1897 (LVII), established an Intergovernmental Working Group of the Committee on Science and Technology for Development (CSTD) and requested it to consider the objectives, topics and agenda for a conference on science and technology and to report its findings to CSTD. The Working Group reported to CSTD in 1975. On 16 September 1975, the General Assembly adopted resolution 3362 (S-VII), in which, in section III, paragraph 7, it decided that a United Nations Conference on Science and Technology should be convened and stated its main objectives.

*Question No. 2.* What are the goals of the 1979 U.N. Conference on Science and Technology for Development?

The entire United Nations system is in one way or another engaged in the task of working out the new arrangements, but this is ultimately a political exercise calling for intergovernmental negotiations backed by national and regional preparations. The basic goal of the 1979 Conference is now laid down in the "enabling" resolution of UN bodies of which the United States is a full member. Resolution 3362 of the General Assembly not only embodies the decision to call the Conference but also provides the concrete framework:

"A. UNCSTD should be held in 1978 or 1979 with the main objectives of strengthening the technological capacity of developing countries to enable them to apply science and technology to their own development; adopting effective means for the utilization of scientific and technological potentials in the solution of development problems of regional and global significance, especially for the benefit of developing countries; and providing instruments of cooperation to developing countries in the utilization of science and technology of solving socio-economic problems that cannot be solved by individual action, in accordance with national priorities, taking into account the recommendations made by the Intergovernmental Working Group of the Committee on Science and Technology for Development." (para 7 of Section III of resolution 3362 (SVII))

At its sixty-first session in July 1976 the Economic and Social Council spelled out the objectives and the agenda of the Conference in its resolution 2028 (LXI). These were subsequently endorsed by all Member States in the resolution of the General Assembly 31/184 of 21 December 1976. The main objectives of the Conference were defined as follows:

To adopt concrete decisions on ways and means of applying science and technology in establishing a new international economic order, as a strategy aimed at economic and social development within a time frame;

To strengthen the technological capacity of developing countries so as to enable them to apply science and technology to their own development;

To adopt effective means for the utilization of scientific and technological potential in the solution of problems of development of national, regional and global significance, especially for the benefit of developing countries;

To provide instruments of co-operation to developing countries in the utilization of science and technology for solving socio-economic problems that cannot be solved by individual action, in accordance with national priorities.

The agenda of the Conference is related to these objectives and reads as follows:

"1. Science and technology for development:

(a) The choice and transfer of technology for development;

(b) Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries;

(c) Methods of integrating science and technology in economic and social development;

(d) New science and technology for overcoming obstacles to development.

2. Institutional arrangements and new forms of international co-operation in the application of science and technology:

(a) The building up and expansion of institutional systems in developing countries for science and technology;

(b) Research and development in the industrialized countries in regard to problems of importance to developing countries;

(c) Mechanisms for the exchange of scientific and technological information and experiences significant to development;

(d) The strengthening of international co-operation among all countries and the design of concrete new forms of international co-operation in the fields of science and technology for development;

(e) The promotion of co-operation among developing countries and the role of developed countries in such co-operation.

3. Utilization of the existing United Nations system and other international organizations;

Utilization of the existing United Nations system and other international organizations to implement the objectives set out above in a co-ordinated and integrated manner.

4. Science and technology for the future:

Debate on the basis of the report of a panel of experts to be convened on this subject."

In a way some of the goals of the Conference are now being negotiated in various fora of the UN: UNCTAD is engaged in working out a code of conduct on transfer of technology through intergovernmental negotiations in which the U.S. (and my country together with other industrialized nations) are playing a full part. UNCTAD is also active in the revision of the Paris Convention dealing with the international patent system which is being done in WIPO, a specialized agency of the UN. UNIDO is similarly trying through negotiations to encourage the building up of industrial capability and hence transferring industrial technology to LDCs. (Mention also code on transnationals?) In one way or another these and other UN organs (UNESCO, UNDP, UNEP, IBRD, etc.) are actively engaged in strengthening the scientific and technological capability in LDC's, and also both directly and indirectly changing the international framework in which technology transfers take place.

In broader terms the objective of the 1979 Conference should be seen in mobilizing international—both governmental and nongovernmental—support for these efforts, and in giving a greater political thrust to these efforts.

*Question No. 3.* In your view, has the industrial block of nations shown significant interest in the Conference?

Developed countries like yours and mine have a great deal to gain from all these processes, but for us to perceive that requires enlightenment, generosity, leadership and an appreciation of longer term considerations as against our narrow short term sectoral or national interests.

The clear fact is that the survival and peace and further growth of the international economy require that the bulk of mankind which at the moment hovers around the brink of poverty be helped rise to a level where they become self-sustaining and reasonably prosperous. Historically, each time we, the now industrialized countries extended our economic frontiers and helped develop the less fortunate regions or countries within our group, we have benefited as a whole. The parallel with LDCs is clear. If some crude calculations can be injected here, we would have one dimension of the problem illustrated.

According to Mr. McNamara's figures, 2,000 million people now inhabit the developing countries (excluding China), and "enjoy" a living standard roughly equal to \$520 per capita (a total income level of about \$1070 billion). If they were approximately to double their living standards—which by the way would only bring them up to the average per capita income of today's Latin America—we would be adding another \$1070 billion a year to the world's income, and proportionately to our markets. As we all know, the industrialized countries are going through a difficult period of growth, and some would maintain that this is a secular trend; consequently, it is in the interest of industrialized countries to enlarge their markets in order to maintain their own growth. What I am driving at is that the developing countries now constitute the new frontier. But for LDCs to reach levels of self-sustenance and reasonable prosperity they need help and generosity on our part, and we need to examine carefully their demands for the new economic order; enlightened opinion in the west now concedes that LDCs are not engaged merely in demagogic exercise, but in restructuring the world order in a manner that is beneficial to all.

Industrial countries have by and large shown a great interest in the science and technology activities of the United Nations system. This is only natural since in the industrial progress of these countries science and technology have played a cardinal role. Their own continued growth of capacity and productivity and hence of their living standards critically hinge upon scientific progress and the implementation of modern technology. Their participation in world trade and investment in particular is largely shaped and determined by the progress of science and technology in different sectors of countries at given moments in time (witness for example the great debate now going on right in our midst on the plight of the steel and electronics industries in the United States; this situation owes a great deal to the dynamics of the processes of generation and diffusion of modern technology).

The industrialized countries are participating fully in the ongoing dialogue in all UN bodies, including the General Assembly, the Economic and Social Council, UNCTAD, UNIDO, UNEP and in the agencies like UNESCO, WIPO, ILO, WHO, etc. (The issue was also discussed at the recent North-South dialogue in Paris.)

As far as the Conference is concerned, the latest opportunity for debating the issues was the current session of the General Assembly. The general debate in the Second Committee dealing with economic issues (and which I presided over during this year), decided to make the Conference one of the subjects for general debate. A large number of industrial country representatives referred to the need to prepare carefully for the Conference, and pledged support to the preparatory process which is an important integral part of this Conference. At the same time industrial country representatives have made a large number of statements in all recent meetings to the importance they attach to science and technology in particular sectors and I need cite only a few here: water, desertification, natural resources, deep sea mining, food and above all, energy. The 1979 Conference and its various themes continue to command the interest of a large number of industrial countries and in a number of different ways and in different fora.

*Question No. 4.* What have other industrialized countries done in preparation for the Conference?

As for preparations for the Conference itself, a number of developed countries have undertaken the task of organizing interdepartmental committees and task forces, and are now preparing national papers as contributions to the Conference. I have specific information about such and similar activities in Australia, Canada, Denmark, Finland, Norway, Sweden, the United States. In addition a number of non-governmental organizations are now gearing up to contributing to the process also. Of course, the process will accelerate as we go along; the RC30 for example is meeting this very month to prepare its input. The Preparatory Committee of the Conference meets in January and we shall be in a far better position then to ascertain the up-to-date situation (see also A/32/230).

*Question No. 5.* Do you view the preparation process of the developing countries as adequate to the intent of the Conference?

As for developing countries, I have information from the secretariat about the organization of focal points (so far more than 70 in developing countries), interdepartmental committees, preparation of national papers (with or without outside experts—more than 60 developing countries have requested the co-operation of United Nations experts in the preparation of their national papers, and some fifteen of these experts are already in the field); national, regional and sub-regional seminars are being organized throughout the Third World (the UN Secretariat has put forward the figure of 42). All the regional commissions have by now met to take a preliminary look at the issues and will meet again in the summer of 1978. Developing country representatives have of course continuously emphasized the importance they attach to the Conference. I do know of some impressions that in many countries the preparatory process has not progressed that well: there are the problems of interdepartmental organization and the unavailability of expertise, but this in itself underlines the basic rationale of the Conference. I have assurance from the Secretary-General of the Conference that he is doing his utmost to ensure that LDCs are adequately prepared and that support to them is strengthened (see A/32/230 and A/C.5/32/89).

## UNITED NATIONS ECONOMIC AND SOCIAL COUNCIL,

August 9, 1973.

Sixty-first session, Agenda Item 14.

## RESOLUTION ADOPTED BY THE ECONOMIC AND SOCIAL COUNCIL.

[on the report of the Economic Committee (E/5877)]

## 2028 (LXI), UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

## THE ECONOMIC AND SOCIAL COUNCIL

Recalling its resolution 1897 (LVII) of 1 August 1974 on the question of convening a United Nations conference on science and technology, in which it, *inter alia*, emphasized the necessity for a conference and recognized that the new needs in the field of science and technology made it imperative for the United Nations to expand international co-operation in the field of science and technology on the basis of principles designed to adjust the scientific and technological relationships among States in a manner compatible with the special requirements and interests of developing countries,

Recalling further that in the same resolution it was also recognized that the conference should be oriented towards the elaboration of methods of action, and affirming that it should make recommendations for concrete action at the national, regional and global levels,

Taking note of the report of the Intergovernmental Working Group of the Committee on Science and Technology for Development,<sup>1</sup>

Stressing that there is a need for the expression of political will to enable all parties to implement the recommended measures,

Bearing in mind the Declaration and the Programme of Action on the Establishment of a New International Economic Order<sup>2</sup> and the Charter of Economic Rights and Duties of States,<sup>3</sup>

Recalling General Assembly resolution 3302 (S-VII) of 16 September 1975 on development and international economic co-operation, in particular paragraph 7 of section III thereof,

Considering that a substantial contribution could be made by science and technology to the process of economic and social development through concerted action at the international level,

1. Recommends to the General Assembly that it decide at its thirty-first session to convene the United Nations Conference on Science and Technology for Development during 1979 in time for the General Assembly to take action in the light of the results of the Conference at its thirty-fourth session;

2. Also recommends that the main objectives of the Conference should be:

(a) To adopt concrete decisions on ways and means of applying science and technology in establishing a new international economic order, as a strategy aimed at economic and social development within a time frame;

(b) To strengthen the technological capacity of developing countries so as to enable them to apply science and technology to their own development;

(c) To adopt effective means for the utilization of scientific and technological potentials in the solution of problems of development of national, regional and global significance, especially for the benefit of developing countries;

(d) To provide instruments of co-operation to developing countries in the utilization of science and technology for solving socio-economic problems that cannot be solved by individual action, in accordance with national priorities;

3. Further recommends that the Conference should be within the following framework:

## I. AGENDA

1. Science and technology for development:

(a) The choice and transfer of technology for development;

(b) Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries;

<sup>1</sup> E/C.8/28.

<sup>2</sup> General Assembly resolutions 3201 (S-VI) and 3202 (S-VI) of 1 May 1974.

<sup>3</sup> General Assembly resolution 3281 (XXIX) of 14 December 1974.

(c) Methods of integrating science and technology in economic and social development;

(d) New science and technology for overcoming obstacles to development.

2. Institutional arrangements and new forms of international co-operation in the application of science and technology:

(a) The building up and expansion of institutional systems in developing countries for science and technology;

(b) Research and development in the industrialized countries in regard to problems of importance to developing countries;

(c) Mechanisms for the exchange of scientific and technological information and experiences significant to development;

(d) The strengthening of international co-operation among all countries and the design of concrete new forms of international co-operation in the fields of science and technology for development;

(e) The promotion of co-operation among developing countries and the role of developed countries in such co-operation.

3. Utilization of the existing United Nations system and other international organizations:

Utilization of the existing United Nations system and other international organizations to implement the objectives set out above in a co-ordinated and integrated manner.

J. Science and technology and the future:

Debate on the basis of the report of a panel of experts to be convened on this subject.

## II. PREPARATORY PERIOD

1. The preparatory period for the Conference should be an integrated and fundamental component of the Conference itself, through preliminary national and regional analyses of relevant socio-economic problems which may be solved with the help of science and technology.

2. The detailed content of the agenda will be determined by the Preparatory Committee, taking into account the deliberations at the national, regional and interregional levels.

3. A limited number of subject areas will be selected with a view to providing important matters for analysis and discussion of the issues listed in the agenda, on the basis of national priorities, through the preparatory process in accordance with the criteria set forth below, the subject areas should:

(a) Be few, with a maximum of five;

(b) Be defined as problem areas with economic and social implications that may be solved by utilizing science and technology;

(c) Require an integrated and interdisciplinary approach and an interagency approach;

(d) Have clear relevance to problems of development in all countries, especially developing countries, and emerge from national priorities through regional consensus;

(e) Be clearly delineated and limited in scope.

(4) The preparatory work should ensure that adequate data and practical analyses shall be made available by means of thorough study by Member States.

4. Requests the Committee on Science and Technology for Development to act as the Preparatory Committee for the Conference, open to the participation of all interested States, and to organize its work in such a way as to ensure the continuity of its preparatory role between its sessions;

5. Requests that a Secretary-General be appointed at the earliest possible time to head a secretariat of the Conference, to be composed of the Office for Science and Technology, which should be strengthened in such a way as to reflect fully the fundamental requirements of development, and of competent personnel from the United Nations Conference on Trade and Development, the United Nations Industrial Development Organization, the United Nations Educational, Scientific and Cultural Organization and other bodies and organizations of the United Nations system; competent bodies and organizations of the United Nations systems should, for the purposes of the Conference, be prepared to depute high-level specialists to the secretariat of the Conference, in order to give substantive support to the Secretary-General of the Conference in the preparatory work for the Conference and to constitute links between those bodies and organizations and the Secretary-General of the Conference;

6. Invites the Secretary-General to request the Administrative Committee on Co-ordination to promote, through its Sub-Committee on Science and Technology



7. Requests that, for the preparatory work leading to the Conference, the Advisory Committee on the Application of Science and Technology to Development should advise, on request, the Secretary-General of the Conference and the Preparatory Committee on matters pertaining to the Conference, and assist and collaborate, at the request of the Secretary-General of the Conference, in the preparation of the Conference at the regional level.

8. Recommends that:

(a) In accordance with the objectives of the Conference, the preparatory process at the national level should take fully into account the necessity that, in agreement with the national development efforts, the scientific and technological content of the agenda should be integrated with its economic and social content;

(b) The science and technology units of the regional commissions should be strengthened, so that they may participate actively in the preparation and organization of the regional meetings to be held prior to the Conference;

9. Requests the Secretary-General and the Committee on Science and Technology for Development to report on the progress of their respective preparatory work;

10. Requests the Secretary-General of the Conference to seek the co-operation of intergovernmental organizations and non-governmental organizations in consultative status with the Economic and Social Council which may be in a position to contribute constructively to the preparation of the Conference;

11. Invites Governments to participate fully in the preparation of the Conference.

*2031st plenary meeting, 4 August 1973.*

UNITED NATIONS GENERAL ASSEMBLY,

*February 23, 1977.*

Thirty-first session, Agenda item 12.

#### RESOLUTION ADOPTED BY THE GENERAL ASSEMBLY

[On the report of the Second Committee A/31/338/Add.2]

*31/184. United Nations Conference on Science and Technology for Development*

#### THE GENERAL ASSEMBLY

Recalling section III, paragraph 7, of its resolution 3302 (S-VII) of 10 September 1975, in which it decided that a United Nations Conference on Science and Technology for Development should be held in 1978 or 1979,

Recalling Economic and Social Council resolutions 1897 (LVII) of 1 August 1974 on the question of convening a United Nations conference on science and technology, 2028 (LXI) of 4 August 1976 on the United Nations Conference on Science and Technology for Development and 2035 (LXI) of 4 August 1976 on the preparatory period for the Conference,

Recalling further the Declaration and the Programme of Action on the Establishment of a New International Economic Order<sup>1</sup> and the Charter of Economic Right and Duties of States,<sup>2</sup>

1. Endorses Economic and Social Council resolutions 2028 (LXI) and 2035 (LXI);

2. Decides to convene the United Nations Conference on Science and Technology for Development during 1979, in time for the General Assembly to take action at its thirty-fourth session in the light of the results of the conference;

3. Decides that the Conference should be within the framework recommended in paragraphs 2 and 3 of Economic and Social Council resolution 2028 (LXI);

4. Requests the Secretary-General to appoint a Secretary-General of the Conference at the earliest possible time, as provided in paragraph 5 of the Council resolution 2028 (LXI), and further requests such appointment to be made at the level of Under-Secretary-General, in order to ensure the appropriate capacity for co-ordination and interaction with Member States and within the specialized agencies and other organizations of the United Nations system;

<sup>1</sup> General Assembly resolutions 3201 (S-VI) and 3202 (S-VI).

<sup>2</sup> General Assembly resolution 3281 (XXIX).

5. Decides that the Committee on Science and Technology for Development shall act as the Preparatory Committee for the United Nations Conference on Science and Technology for Development, open to the participation of all States, and further decides that the Preparatory Committee shall hold its first session early in 1977 and submit its report to the General Assembly at its thirty-second session through the Economic and Social Council at its sixty-third session;

6. Requests the Preparatory Committee to consider, taking into account the time needed for the due completion of the various stages of preparation for the Conference, the question of the time-table, sites and other necessary arrangements for the regional and interregional preparatory meetings and to submit its proposals to the Economic and Social Council at its sixty-third session;

7. Also requests the Committee on Science and Technology for Development to consider, at its meeting in 1977, as the Preparatory Committee, the draft provisional agenda for its fourth regular session;

8. Decides to take a final decision on the question of the site of the Conference at its thirty-second session;

9. Invites the specialized agencies, in particular the United Nations Educational, Scientific and Cultural Organization, as well as the International Atomic Energy Agency and the interested organs of the United Nations, the United Nations Conference on Trade and Development, the United Nations Industrial Development Organization and the regional commissions to co-operate fully in the preparations for the Conference, as provided by Economic and Social Council resolution 2028 (LXI);

10. Requests the Committee on Science and Technology for Development to take fully into account, in the process of preparation for the Conference, the interrelationship between the scientific/technological fields and other areas of activity of the United Nations system, in particular the economic area, so as to create more favourable conditions for the further promotion of comprehensive international co-operation;

11. Invites the Secretary-General to request the Administrative Committee on Co-ordination to promote, through its Sub-Committee on Science and Technology close and permanent contact with the Secretary-General of the Conference;

12. Decides that, for the preparatory work leading to the Conference, the Advisory Committee on the Application of Science and Technology to Development should advise, on request, the Secretary-General of the Conference and the Preparatory Committee on matters pertaining to the Conference and should assist and collaborate, at the request of the Secretary-General of the Conference, in the preparations for the Conference at the regional level;

13. Requests the Secretary-General of the Conference to seek the co-operation of intergovernmental organizations and non-governmental organizations in consultative status with the Economic and Social Council which may be in a position to contribute constructively to the preparation of the Conference;

14. Invites Governments to participate fully in the preparations for the Conference, taking into account the provisions of Economic and Social Council resolutions 2028 and (LXI) and 2035 (LXI);

15. Requests the Secretary-General of the United Nations to submit a report to the General Assembly at its thirty-second session, through the Economic and Social Council, on the implementation of the present resolution.

*106th plenary meeting December 1976.*

UNITED NATIONS GENERAL ASSEMBLY,  
*October 5, 1977.*

Thirty-second session, Agenda item 73.

UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

### *Report of the Secretary-General*

#### I. INTRODUCTION

1. By its resolution 31/184 of 21 December 1976, the General Assembly, *inter alia*, decided to convene the United Nations Conference on Science and Technology for Development in 1979 and adopted a number of provisions concerning the preparation of the Conference.

2. In paragraph 15 of resolution 31/184, the General Assembly requested the Secretary-General to submit to the Assembly at its thirty-second session, through the Economic and Social Council, a report on the implementation of that resolution. In accordance with the request of the General Assembly, the Secretary-General submitted a report which the Economic and Social Council considered at its sixty-third session (E/6000). The purpose of the present document is to bring up to date the information contained in the aforementioned report. A document on administrative and financial questions will be issued subsequently.

3. At its sixty-third session, the Economic and Social Council took note of the report of the Secretary-General (decision 272 (LXIII)) and adopted resolution 2123 (LXIII) of 4 August 1977.

4. On 30 September 1977, 76 countries—including 51 developing countries—reported that they had established "focal points" (see A/CONF. 81/INF. 2/Rev. 1). This information is very encouraging, for, besides symbolizing the interest of Member States, the establishment of national focal points has the advantage of considerably simplifying contacts between Member States and the secretariat of the Conference. It should be observed in this regard that the focal point may be simply a correspondent or, and this is obviously more desirable, the person or body actually responsible for supervising and centralizing the preparation of the national papers. The note of 31 August 1977 stresses this point.

## II. CO-OPERATION WITH MEMBER STATES

5. The exchanges of views with Member States and the crystallization of ideas during the preparatory work indicate that co-operation between the secretariat of the Conference and Member States can be achieved in four principal ways.

6. The first is to ensure the establishment of national institutional arrangements, which are frequently inadequate or inexistent owing to the depth and range of the subject-matter "science and technology". This measure is essential to the preparation of the national papers and the execution of substantive co-operation activities. The secretariat of the Conference has assisted in the establishment of institutional arrangements in 42 States.

7. The second way is for the secretariat of the Conference, in co-operation with the regional commissions and United Nations bodies, to send experts to Member States. To date, the countries interested in this form of co-operation are distributed as follows:

(a) *Region of the Economic and Social Commission for Asia and the Pacific*  
Afghanistan, Fiji, Indonesia, Iran, Malaysia, Philippines, Sri Lanka and Thailand.

(b) *Region of the Economic Commission for Latin America*

Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Nicaragua, Panama and Paraguay.

(c) *Region of the Economic Commission for Africa*

Benin, Burundi, Central African Empire, Chad, Comoros, Congo, Ethiopia, Gabon, Guinea, Ivory Coast, Kenya, Liberia, Madagascar, Mali, Mauritius, Morocco, Niger, Rwanda, Sierra Leone, Sudan, Togo, Upper Volta, Zaire and Zambia.

(d) *Region of the Economic Commission for Western Asia*

Democratic Yemen, Jordan, Lebanon and Yemen.

(e) *Region of the Economic Commission for Europe*

Co-operation of this type with five States was the subject of a global request from the Economic Commission for Europe.

The Conference secretariat, in co-operation with the regional commissions and United Nations bodies, will endeavour to institute the desired co-operation with the greatest possible number of these States before the end of 1977. Despite the relatively short time which has elapsed since the receipt of the first requests, a number of experts have already begun their work in the field and others are now being recruited.

8. The third way is to request the Conference secretariat to assist in the organization of a seminar or working group, in accordance with the recommendation in paragraph 5 of Economic and Social Council resolution 2035 (LXI), with appropriate participation by the regional commissions and organs of the United Nations system. The seminar or working group may consider the entire

agenda of the Conference, a substantial part of it, one agenda item or subitem, or even one or more specific sectoral problems. It would be desirable to invite nationals of developing countries to these seminars or working groups so that the fruits of national experience can be extended to the greatest possible number of countries, on a regional, subregional or other basis ("open" national seminars).

9. The fourth way is to organize regional seminars or working groups proper, as provided for in paragraph 6 of Economic and Social Council resolution 2035 (LXI). According to the recommendations of the Council in resolution 2123 (LXIII), these meetings should assimilate subregional seminars and working groups.

10. So far, the following meetings are being organized within the United Nations system:

*(a) Meetings exclusively concerned with the preparation of the Conference*

*(i) Region of the Economic and Social Commission for Asia and the Pacific*

Four open national seminars, (India, Indonesia, Malaysia and the Philippines).

Open national seminar, 2-5 November 1977, with the support of UNESCO (Thailand).

Subregional seminar, 1978 (Fiji).

Open national seminar with the support of UNESCO (Iran).

*(ii) Region of the Economic Commission for Latin America*

Subregional seminar for Central America and Panama, 10-14 October 1977 (Guatemala).

Subregional seminar for the Caribbean, end of December 1977 (Trinidad and Tobago).

Regional seminar for the preparation of a Latin American programme for the Conference, June 1978 (Venezuela, in co-operation with SELA).

National seminar (Brazil or another country of the region), December 1977.

*(iii) Region of the Economic Commission for Africa*

Subregional French-speaking sub-Saharan seminar.

Two open subregional seminars for English-speaking sub-Saharan Africa (United Republic of Tanzania and one country from the west coast).

National seminar, October-November 1977 (Morocco).

National seminar, October 1977, Kumasi (Ghana).

National seminar with the support of UNESCO (Egypt).

Open national seminar in East Africa.

*(iv) Region of the Economic Commission for Western Asia*

Regional seminar, 7-11 November 1977 (Jordan).

National seminar (Lebanon).

*(v) Region of the Economic Commission for Europe*

Open Nordic seminar, 16-17 November 1977, with the support of UNESCO (Norway).

*(b) Meetings providing support to the Conference or including in their agenda an item relating thereto (organized in co-operation with the secretariat of the Conference)*

*(i) Region of the Economic and Social Commission for Asia and the Pacific*

Seminar on patents, early 1979, with the support of WIPO.

*(ii) Region of the Economic Commission for Latin America*

Regional seminar on patents, 26-28 October 1977, with the support of WIPO (Mexico).

Subregional seminar on the transfer of technology (Latin America and the Spanish-speaking Caribbean), March-April 1978, with the support of UNCTAD.

Subregional seminar on the transfer of technology (rest of Latin America), end of 1978, with the support of UNCTAD.

Consultations on science and technology policies in the Caribbean region, 12-17 December, with the support of UNESCO (Guyana).

Conference of directors of scientific research boards, 15-18 March 1978, with the support of UNESCO (Ecuador).

(iii) *Region of the Economic Commission for Africa*

Consultative meeting on the co-ordination of science and technology policies in West Africa, October 1978, Kumasi (Ghana).

Two national seminars, 1978 (east-coast country).

(iv) *Region of the Economic Commission for Western Asia*

Seminar on the transfer of technology, organized by the Commission with the support of UNCTAD, 8-16 October 1977.

Conference on a science and technology policy, 7-11 November 1977 (Jordan).

(v) *Region of the Economic Commission for Europe*

International conference on the transfer of technology, with the support of UNCTAD, May 1977 (Yugoslavia).

Open seminar on technologies, 18-19 November 1977, with the support of UNCTAD, University of Nice (France).

(vi) *Interregional meetings (Arab countries)*

Meeting on CASTARAB, end of March 1978, with the support of UNESCO.

Seminar on patents, May 1978, with the support of WIPO (Egypt).

Meeting on pharmaceutical products, 1979, with the support of UNCTAD.

11. Bearing in mind the concern to assure—in accordance with the guiding principles of the Conference—respect for national sovereignty and objectives, and interaction between developed and developing countries, and among developing countries, and also to satisfy the desire of many countries to receive assistance, preferably from experts from their own region, the practice has been adopted of giving the greatest possible freedom of choice to the State wishing to receive experts. Normally, as soon as the request is received, the Conference secretariat sends to the Member State a list of experts from different regions and leaves the selection to it.

12. To date, a large number of countries (Brazil, France, German Democratic Republic, Germany (Federal Republic of), Guatemala, Hungary, India, Israel, Kenya, Mexico, Netherlands, Nigeria, Pakistan, Peru, Poland, Romania, Sweden, Union of Soviet Socialist Republics, United States of America and Venezuela) have submitted to the Conference secretariat the candidatures of technical experts willing to co-operate in the preparation of national papers with countries which so request.

## III. CO-OPERATION WITH THE REGIONAL COMMISSIONS

13. In order to enable the regional commissions of developing regions to make a full contribution to the preparations for the Conference, each has been strengthened by the addition of a regional adviser, a P-4 post and a General Service post.

14. On 1 July 1977, the Executive Secretaries of the regional commissions and the Secretary-General of the Conference reviewed the preparations for the Conference. They considered that the regional commissions should be given increased means, both personnel and resources, so as to be able to contribute fully to the preparatory process of the Conference. This point of view was endorsed in paragraph 8 of resolution 2128 (LXIII) of the Economic and Social Council.

15. The calendar of the first round of regional meetings, to be held in 1977, is as follows:

Economic Commission for Africa: Arusha (United Republic of Tanzania), October 3-8.

Economic Commission for Latin America: Mexico, October 31-November 2.

Economic Commission for Europe: Geneva, December 6-8.

Economic and Social Commission for Asia and the Pacific: Bangkok, December 8-12.

Economic Commission for Western Asia: Beirut December 10-21.

16. With regard to the second round of regional meetings, which will be held in 1978, the Economic Commission for Latin America adopted at its seventeenth session a resolution which provides for the convening in due course of a conference at the ministerial or equivalent level and requested its secretariat to prepare a background document. The science and technology advisers of the Governments of the countries of the Economic Commission for Europe have recommended the convening at Bucharest of a regional conference which is expected to open on 26 June 1978. The African meeting will probably be held at Cairo.

#### IV. CO-OPERATION WITH THE SPECIALIZED AGENCIES, THE INTERNATIONAL ATOMIC ENERGY AGENCY AND INTERESTED ORGANS OF THE UNITED NATIONS SYSTEM<sup>1</sup>

17. On 6 July 1977, the Secretary-General of the Conference informed the Administrative Committee on Co-ordination of developments since April and their implications for co-ordination within the United Nations system.

18. The Committee for Programme and Co-ordination emphasized that direct secondment was only one way of participating in the work of the Conference and that another, equally important, was assistance through ongoing work in each organization.<sup>2</sup> The Committee also emphasized the importance of the preparatory process and the fact that the success of the Conference depended to a large extent on the degree of co-operation and co-ordination within the United Nations system. It expressed concern that some organizations which were particularly linked to the work of the Conference did not seem to have made budgetary estimates for the necessary preparatory work. Paragraph 8 of resolution 2123 (LXIII) of the Economic and Social Council refers to this problem.

19. It should also be observed that the Office for Inter-Agency Affairs and Co-ordination and the Centre for Economic and Social Information have contributed substantially to the preparatory work and that the assistance of UNDP and its resident representatives is particularly important.

20. The regional groups and the *ad hoc* groups of the Advisory Committee on the Application of Science and Technology to Development have continued to study, in co-operation with the Secretary-General of the Conference, the preparations for the Conference and ways of integrating their work.

#### V. CO-OPERATION WITH INTERGOVERNMENTAL ORGANIZATIONS OUTSIDE THE UNITED NATIONS SYSTEM

21. The following organizations have shown particular interest in contributing to the Conference and its preparatory process: the Council of Europe, the Council for Mutual Economic Assistance, the Organisation for Economic Co-operation and Development, the Organization of African Unity, the Organization of American States, the League of Arab States, the Agency for Cultural and Technical Co-operation, the Intergovernmental Committee for European Migration, the Commonwealth Secretariat, the Inter-American Development Bank, the Central American Research Institute for Industry and the Latin American Physics Centre.

22. A number of the aforementioned organizations are organizing meetings and offering specific contributions to the preparation of the Conference in the spirit of paragraph 13 of resolution 31/184 and paragraphs 7 and 11 of decision 1 (I) of the Preparatory Committee. The following meetings, in particular, deserve mention:

##### (a) *Africa:*

Organization of African Unity:  
African Scientific Council, April 1978 (Algeria)

##### (b) *The Americas*

Organization of American States:  
Seminar for the Caribbean countries on science and technology policies and planning, 26-30 September 1977 (Dominican Republic).  
Meeting of the Central American Commission for Science and Technical Research in Central America and Panama, November 1977 (Nicaragua).

##### (c) *Europe:*

Commission of the European Communities.  
Conference on solar energy, 1978

##### (d) *Interregional meetings*

Agency for Cultural and Technical Co-operation (French-speaking countries):  
Conference of Ministers for Scientific Policy, 19-24 September 1977 (Luxembourg), in which the Secretary-General of the Conference

<sup>1</sup> A summary of the work contributed by these bodies to the preparation of the Conference will be issued as document A/32/230/Add.1.

<sup>2</sup> *Official Records of the General Assembly, Thirty-second Session, Supplement No. 38* (A/32/38), paras. 280 and 290.

participated and which recommended that the States members of the Agency should participate fully in the Conference and its preparations. Intergovernmental Committee for European Migration : Seminar on the transfer of technology through migration, 28 November-2 December 1977 (Venezuela).

#### VI. CO-OPERATION WITH NON-GOVERNMENTAL ORGANIZATIONS

23. The secretariat of the Conference is co-operating closely with numerous non-governmental organizations, whether or not they are in consultative status with the Economic and Social Council (see annex). A few examples will suffice.

24. The Economic and Social Committee of the Interparliamentary Union, which met at Canberra in April 1977, endorsed the basic concepts of the Conference and emphasized the need for careful preparation.

25. The Committee on Science and Technology in Developing Countries of the International Council of Scientific Unions convened a working group at Madrid in August 1977; the group prepared a model national analysis. UNESCO agreed to defray the expenses. The secretariat of the Conference invited members of the regional group from developing regions of the Advisory Committee on the Application of Science and Technology to Development to take part on an individual basis in this group.

26. The International Council of Scientific Unions, at its General Assembly held at Budapest in September 1977, agreed to assist in the organization of a meeting in November 1977 for the purpose of examining ways of preparing a conference of non-governmental organizations on science and technology for development, which would be held in March-April 1979.

27. The Secretary-General of the Conference participated in the twenty-seventh Pugwash Conference on Science and World Affairs, held at Munich in August 1977. Questions relating to the United Nations Conference were discussed and the following recommendations were adopted :

(a) A working group should be organized by Pugwash in the near future to discuss the necessary conditions for the success of the United Nations Conference and to prepare the Pugwash contribution to the substantive work thereof;

(b) The Pugwash Council should establish forthwith a system of co-ordination to deal with the Pugwash contribution to the preparations for the United Nations Conference.

28. The Association Henri Laugier is organizing, in Paris in November 1977, a symposium on the topic "Scientific discoveries and innovations for the third world", with the participation of nationals of developing countries. The Secretary-General of the Conference has been invited to preside over one of the meetings of this symposium.

#### VII. SCIENCE, TECHNOLOGY AND THE FUTURE

29. In accordance with paragraph 3 of resolution 2028 (LXI), consideration of agenda item 4 of the Conference (Science and technology for the future) will take the form of a discussion based on the report of a group of experts which will meet to study this question.

30. The Secretary-General of the Conference intends to prepare an in-depth study on this subject, in keeping with the objectives of the Conference. The study will deal with the potential contribution of science and technology to various development options for the future rather than with the evolution itself of science and technology. Non-governmental organizations may make contributions to this study.

31. These matters, together with other questions of methodology, will be discussed at a first meeting of experts, to be held at Geneva from 21 to 25 November 1977.

#### ANNEX

##### ORGANIZATIONS WHICH HAVE OFFERED TO PARTICIPATE ACTIVELY IN THE PREPARATORY WORK OF THE CONFERENCE

##### A. NON-GOVERNMENTAL ORGANIZATIONS IN CONSULTATIVE STATUS WITH THE ECONOMIC AND SOCIAL COUNCIL

##### Category I

International Alliance of Women  
International Chamber of Commerce

International Confederation of Free Trade Unions  
 International Co-operative Alliance  
 International Council of Voluntary Agencies  
 Inter-Parliamentary Union  
 World Confederation of Labour

*Category II*

Associated Country Women of the World  
 Baptist World Alliance  
 Chamber of Commerce of the United States of America  
 Christian Democratic World Union  
 International Civil Airports Association  
 International Commission on Irrigation and Drainage  
 International Council of Scientific Unions  
 International Council of Societies of Industrial Design  
 International Federation of University Women  
 International Petroleum Industry Environmental Conservation Association (IPIECA)  
 International Union of Architects  
 International Union of Public Transport  
 Latin American Association of Finance Development Institutions (ALIDE)  
 Latin American Iron and Steel Institute  
 Mutual Assistance of the Latin American Government Oil Companies (ARPEL)  
 Panafrican Institute for Development  
 Socialist International  
 World Council of Management  
 Action for World Development, Chippendale, New South Wales, Australia.  
 American Association for the Advancement of Science.  
 International Institute for Environment and Development.  
 Sierra Club.

*Roster*.—Organizations placed on the Roster by action of the Secretary General of the United Nations:

American Association for the Advancement of Science.  
 International Institute for Environment and Development.  
 Sierra Club.

*Roster*.—Organizations placed on the Roster by virtue of their consultative status with specialized agencies or other United Nations bodies:

World Federation of Engineering Organizations.  
 World Federation of Scientific Workers.  
 World Future Studies Federation.

**B. ORGANIZATIONS HAVING NO CONSULTATIVE STATUS WITH THE ECONOMIC AND SOCIAL COUNCIL**

Action for World Development, Chippendale, New South Wales, Australia.  
 American Society for Engineering Education, New York, United States of America.  
 Asia Productivity Organization, Tokyo, Japan.  
 Aspen Institute for Humanistic Studies, New York, United States of America.  
 Association des universités de langue française.  
 Association Henri Laugier, France.  
 Association mondiale des médecins francophones.  
 Brazilian-American Research Institute for Industry.  
 Central American Research Institute for Industry, Guatemala.  
 Developing World Industry and Technology, Washington, D.C., United States of America.  
 East-West Center, Honolulu, United States of America.  
 Inter-American Society of Psychology, Chicago, United States of America.  
 Intermediate Technology, California, United States of America.  
 International Centre for Research and Development.  
 International Council for Science Policy Studies.  
 International Foundation of Institutes for Advanced Study, Paris, France.  
 International Foundation for Development Alternatives, Nyon, Switzerland.  
 International Institute for Applied Systems Analysis, Laxenburg, Austria.  
 National Energy Resources Organization, Silver Spring, Maryland, United States of America.



Pugwash Conference for Science and World Affairs.  
 Science Policy Foundation, London, United Kingdom.  
 Scientists' Institute for Public Information, New York, United States of America.  
 Society for the Psychological Study of Social Issues, Columbus, Ohio, United States of America.  
 Stanley Foundation, Muscatine, Iowa, United States of America.  
 Transnational Network of Appropriate/Alternative Technologies, Rangeley, Maine, United States of America.  
 Vienna Institute for Development, Vienna, Austria.  
 World Council of Churches, Geneva, Switzerland.  
 World Neighbors, Oklahoma City, United States of America.

#### *Institutes of Higher Learning*

Brandeis University, Waltham, Massachusetts, United States of America.  
 Cornell University, Ithaca, New York, United States of America.  
 George Washington University, Washington, D.C., United States of America.  
 Graduate Institute for International Studies, Geneva, Switzerland.  
 International Institute for Hydraulic and Environmental Engineering, Delft, The Netherlands.  
 North East London Polytechnic, Dagenham, Essex, United Kingdom.  
 Ohio State University, Ohio, United States of America.  
 Universidade Estadual de Campinas (IMECC-UNICAMP), Campinas-SP, Brazil.  
 University of Aston, Birmingham, United Kingdom.  
 University of Bradford, West Yorkshire, United Kingdom.  
 University of Chicago, Chicago, Illinois, United States of America.  
 University of Lund, Sweden.  
 University of the South Pacific, Suva, Fiji.

UNITED NATIONS CENTRE FOR ECONOMIC AND SOCIAL INFORMATION,  
 October 17, 1977.

#### *Background*

#### THE NEED FOR A CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

The actual substance of science and technology will not be under discussion at the United Nations Conference on Science and Technology for Development (UNCSTD), scheduled to be held in August/September 1979. Instead, the Conference will take stock of the role that science and technology must play in correcting social and economic inequities within and among nations.

Preparations for the Conference are taking place at a time when it is recognized that as a result of today's methods of research and their implementation, current technology has greatly expanded the potential application of scientific knowledge. This potential is of such magnitude that it could result in radical improvement in well-being and quality of life for all peoples . . . especially those in the developing nations.

While this is so, considering its wide-ranging effects and the inherent difficulties in its control, unwise application of technology may not only upset desirable patterns of life and degrade global ecology—it may even threaten the existence of life itself.

The primary purpose of UNCSTD is, therefore, to consider how technology might best be harnessed as a means for salutary social change and economic progress for all peoples. As a result, the Conference will scrutinize the interrelationship between scientific/technological disciplines and socio/economic development.

#### *The Need for UNCSTD*

It might well be argued that the crucial need for the Conference stems largely from a re-examination, on the part of the international community, of the role of science and technology in the total developmental process. For historically, in contributing to the growth of industry in the developed societies, science and technology often only incidentally contributed to the general economic growth and betterment. In short, it has become increasingly evident that technology and related scientific research are fundamental tools for achieving predetermined, integrated social and economic developmental objectives.

#### *The Lack of General Application of Science and Technology*

Technology—the technical application of science—has largely contributed to the emergence of highly-developed societies. But in general, it has not signif-

cantly benefited the great mass of humanity in most of the developing countries. To cite but two harrowing examples: a quarter of the population of our planet is now hungry while still another quarter is severely undernourished; further, two-thirds of the world's population do not have reasonable access to an adequate supply of water. Paradoxically, although mankind has the technical capability to alleviate, if not cure such ills right now, this capability has not yet been applied so as to solve the fundamental problem of day-to-day survival for the majority of the world's population. Indeed it can be argued that often, the application of technology has merely accentuated the disparity between the rich and poor—be this within or among certain nations.

The disparity between the developed and developing countries is all the more striking when their relative levels of research, technological and institutional capacity are compared. For example, estimates indicate that more than nine-tenths of current scientific research is being carried out in the countries of the developed world which account for only one-third of global population.

While this is so, the development of a country is not merely dependent on advanced technology alone—although this cannot be underestimated. Socio-economic development must essentially draw its vitality from the whole complex of local and regional scientific research, pertinent technological innovations, and their specific application. However, development in many instances, depends on the transfer of advanced technology from other societies—provided that its impact upon existing local cultural, environmental and socio-economic conditions is truly beneficial, and provided that its introduction is consistent with national developmental aspirations.

#### *The Importance of Self-reliance*

It follows that in the context of the United Nations Declaration on the Establishment of a New International Economic Order, further application of technology and the scientific research on which it is based, must be directly related to the entire process of economic and social development for the benefit of mankind as a whole.

Toward that goal, self-reliance among the developing countries must be recognized as fundamental to the implementation of the New International Economic Order. That is to say: the development effort should be the primary responsibility of the developing countries themselves. The term "self-reliance" does not imply an imperative of autocracy or self-sufficiency. It implies rather, the will to create and benefit from a capacity for autonomous decision-making. It implies further, a capacity for critical assessment of the many available developmental options as part of such decision-making. Most important, it implies the will to implement all aspects of the developmental process—including the application of science and technology—for the benefit of the entire society.

#### *The Institutional Background to UNCTAD*

The importance of science and technology for development was implicit, if not explicitly spelled-out, in the Charter of the United Nations and many agencies and programmes of the United Nations system have undertaken extensive activities in this area over the years.

In the early 1960s, during the United Nations First Development Decade, disappointment about the slow rates of growth in the developing world, plus a conviction that advances in science and technology could be effective in promoting a rapid socio-economic growth in developing countries, led to the convening in 1963 of the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas. Although the Conference resulted in a useful exchange of scientific and technological information, little of this was of practical relevance to the particular social settings in which development was either needed or taking place.

Yet the Conference did leave an important institutional legacy: the Advisory Committee on the Application of Science and Technology to Development (ACASTT). This group of independent experts in co-operation with concerned United Nations bodies and agencies subsequently drew up a World Plan of Action which acknowledged that investment in science and technology can yield effective results only when applied on a vastly greater scale than current programmes directed towards development. The Plan also recognized that whether technologies are acquired through the evolution of endogenous capabilities or through their transfer from developed nations, either way, both are fundamental to development.

Further, it was suggested that in redressing international inequalities, developed nations should divert a greater proportion of their financial resources

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from military spending towards socio-economic development. At the same time, it was equally suggested that developing countries should make every possible effort to initiate or evolve their own forms of scientific and technological capability with the ultimate goal of greater, if not entire, self-reliance. To that end, an endogenous capacity in science and technology, plus a capacity for their critical assessment was the major premise, and indeed one of the essential goals, of the World Plan of Action.

The International Development Strategy for the Second United Nations Development Decade stressed that substantial contributions of funds and a determined mobilization of efforts were prerequisites for any development based on science and technology. The Strategy to implement the goals of the Second Development Decade determined that substantial supplemental funds would have to be obtained not only from the developed but also from the developing countries themselves.

Responding to the need to oversee and to co-ordinate the various scientific and technological activities of its whole system, the United Nations created in 1973 a Committee on Science and Technology for Development (CSTD). A subsidiary body of the Economic and Social Council, its purpose was to instill previously lacking political will into the process of scientific and technological development.

#### *Summary: Where We Stand Today*

International debate on the role of science and technology for development intensified with the introduction of new concepts of development, and particularly with the issue of quantified targets. More recently, the discussions concerning a New International Economic Order provided a broad framework within which science and technology were perceived as a potential link between the various aspects of socio-economic betterment. Over recent years at a series of United Nations Conferences—on the environment, population, food, industrialization, the law of the sea, employment, human settlement, water, and desertification—new light has been shed on the importance of science and technology in national and international development. In still other ways, several United Nations bodies, as well as numerous intergovernmental and non-governmental organizations, have contributed towards clarifying and strengthening the relationship between science and technology and the total developmental process in a variety of sectoral, interdisciplinary and geographic areas.

Nevertheless, much still remains to be achieved. For many elements are still lacking in the necessarily massive and systematic application of science and technology to development: first, the effective interest and political willingness to act on the part of all concerned; second, an appropriate overview and co-ordination of all past, current and planned activities in this complex, widespread field; third, a concrete programme of action defining specific goals and targets, together with the respective roles to be played in achieving these by the individual countries themselves and by the United Nations system as a whole.

As a result, a central aim of UNCSTD is to organize hitherto lacking motivation in these three critical areas. At the same time, due consideration will be given to ways in which self-reliance among developing countries might best be accomplished.

Given the many revisions in developmental philosophy that have taken place over recent years, it is believed that in contrast to the Conference of 1963, UNCSTD should have at its core of discussion, the interrelationship among the political, scientific and technological components of socio-economic development.

UNITED NATIONS GENERAL ASSEMBLY,  
November 1, 1977.

Thirty-second session, Agenda item 73.

UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

#### *Report of the Secretary-General*

#### *Addendum*

#### 1. INTRODUCTION

1. The United Nations Conference on Science and Technology for Development is an operation which involves all parts of the United Nations system. This system-wide character has been emphasized in the relevant resolutions of

the General Assembly, the Economic and Social Council and the Preparatory Committee for the Conference.

2. The present addendum contains summaries of reports submitted by organizations and other concerned bodies of the United Nations system on their participation in the preparations for the Conference.

3. The contributions which the various organizations of the system intend to make were shown in the report of the Secretary-General (A/C.2/31/13, annex III) presented to the General Assembly at its thirty-first session. In submitting their current records, organizations confirmed their intention to maintain or improve upon these contributions.

## II. REPORTS SUBMITTED BY ORGANIZATIONS OF THE UNITED NATIONS SYSTEM ON THEIR PREPARATORY ACTIVITIES FOR THE UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

### A. *Economic Commission for Europe (ECE)*

4. Activities of ECE in preparation for the United Nations Conference on Science and Technology for Development included a special ad hoc meeting at Geneva on 18 and 19 May 1977. Documents and discussions of that meeting dealt with the following: (a) preparations within the United Nations system; (b) responses from Governments on contributions within the framework of ECE to preparations for the Conference; and (c) the possible contribution of senior advisers to ECE Governments on science and technology.

5. The senior advisers decided to meet in special sessions from 6 to 8 December 1977 to review regional activities and to agree on plans for the regional preparatory meeting for the Conference to be held in Bucharest from 26 June to 1 July 1978.

### B. *Economic and Social Commission for Asia and the Pacific (ESCAP)*

6. Following the first session of the Preparatory Committee for the Conference,<sup>1</sup> a note on the role of the Economic and Social Commission for Asia and the Pacific in the preparatory work was presented to the Commission at its thirteenth session. Member countries of the Commission were invited to proceed with their national preparations and the Commission drew up a programme and discussed it with the regional group of the Advisory Committee on the Application of Science and Technology to Development in Bangkok in August 1977.

7. A meeting was also held with representatives of United Nations agencies located at Bangkok to review and advise on the arrangements proposed by ESCAP for preparing national and regional papers.

8. The ESCAP secretariat continues to maintain close contact with member countries regarding the establishment of focal points for the Conference and the organization of seminars and workshops. A newsletter on Conference activities will be issued to facilitate the flow of information between countries.

9. The first regional preparatory meeting is to be held in December 1977.

10. The recruitment of the additional staff provided for in the Conference budget (regional adviser, co-ordination officer and secretarial assistance) has been initiated.

### C. *Economic Commission for Latin America (ECLA)*

11. A document highlighting the regional significance and implications of the United Nations Conference on Science and Technology for Development was presented to the Commission at its seventeenth session. A member of ACAST reported on this occasion on the preparatory work for the Conference so far accomplished.

12. The first preparatory meeting of ECLA is scheduled to be held in Mexico from 31 October to 2 November to discuss subject areas, the preparation of national papers and assistance requirements.

13. Resolution 874 (XVII) adopted by the Commission calls for the convening of the second intergovernmental preparatory meeting for the second semester of 1978. The science and technology unit of ECLA urged countries to expedite national preparations and drew their attention to the co-operation offered by the secretariat of the Conference; the unit will co-operate with national focal points and prepare the regional paper of ECLA for the second preparatory meeting.

<sup>1</sup> For the report on the first session of the Preparatory Committee, see *Official Records of the General Assembly, Third-second Session, Supplement No. 13* (A/32/43).

14. A meeting of Central American countries and Panama was held in Guatemala from 10 to 14 October to discuss guidelines for national papers.

15. The World Intellectual Property Organization (WIPO) and the Economic Commission for Latin America sponsored a seminar, held in Mexico from 26 to 28 October, to examine the role of patents in relation to the Conference.

16. A special meeting for the Caribbean is planned for December 1978.

#### *D. Economic Commission for Africa (ECA)*

17. The report on the first session of the Preparatory Committee for the Conference (A/32/43) has been mailed to member States of ECA, to their embassies in Addis Ababa and to science and engineering faculties of universities.

18. A meeting was held at Addis Ababa from 24 to 28 January to discuss science and technology projects for strengthening the technological capacity of member States. The first preparatory regional meeting of governmental experts took place in Arusha, United Republic of Tanzania, from 3 to 8 October, and included the discussion of background papers covering subject areas for national papers; preparatory activities planned for 1977 and 1978 and arrangements for regional meetings in 1978 were also reviewed.

#### *E. Economic Commission for Western Asia (ECWA)*

19. Notes verbales were addressed by ECWA to its member States informing them of preparatory work for the Conference, requesting designation of focal points and offering help in the preparation of national papers, as well as asking for suggestions for the first regional meeting. Lebanon, Democratic Yemen and Yemen have requested assistance.

20. The first preparatory regional meeting of ECWA will be held at Beirut from 19 to 21 December 1977. The agenda will include a review of progress in preparing national papers by member States and recommendations on five subject areas for the Conference.

21. Arrangements for the recruitment of regional advisers, co-ordination officer and secretarial assistance have been made as provided for in the budget of the Conference.

#### *F. United Nations Conference on Trade and Development (UNCTAD)*

22. A great number of UNCTAD activities, aimed at strengthening the technological capability of developing countries, are broadly related to the preparations of the United Nations Conference on Science and Technology for Development, though continuing beyond the Conference time-frame. To help countries in elaborating their national technology policies and plans and in establishing national institutions for the transfer and development of technology, the newly established Advisory Service on Transfer of Technology of UNCTAD has sent missions to Afghanistan, Ethiopia, Iraq, Sri Lanka and Venezuela. National centres for the transfer and development of technology are now to be established in four of these countries. Work in this direction is also under way in Algeria, Burundi and Trinidad and Tobago and will continue in some 20 countries which have requested assistance.

23. Together with other United Nations organizations, UNCTAD helps national Governments and regional commissions in establishing regional centres for the transfer and development of technology. In July 1977, The Asian Centre for Technology Transfer was inaugurated in Bangalore, India. An interagency mission on a regional centre for transfer, adaptation and development of technology in Africa was carried out and the plenipotentiary meeting to establish a centre, as requested by UNCTAD in resolution 87 (IV), will be held before the end of the year. Work on setting up a regional centre in Western Asia is well under way and the centre will be established next year.

24. A number of studies have been completed or are under way on ways to strengthen the technological infrastructure of developing countries. Subjects studied include the impact of trademarks on the development process; the role of the public sector in development and transfer of technology; technology planning in developing countries; the experience of the socialist countries of Eastern Europe in the transfer of technology to developing countries; and case studies of the pharmaceutical sector in Afghanistan, the Caribbean Community, India, Nepal, Sri Lanka and Venezuela.

25. Three meetings of an intergovernmental group of experts on an international code of conduct on transfer of technology have taken place, and two more meetings are planned to precede the United Nations conference on the adoption of the code, which is scheduled to be held in October-November 1978.

26. UNCTAD is participating in the preparations for a diplomatic conference to be convened by the World Intellectual Property Organization (WIPO) for revision of the Paris Convention for the Protection of Industrial Property. A meeting of governmental experts will be convened by UNCTAD in October 1978 to examine the economic, commercial and developmental aspects of industrial property in the transfer of technology to developing countries.

27. Another intergovernmental group of experts will meet from 27 February to 7 March 1978 to consider problems of "brain drain", on which policy studies have been prepared by the UNCTAD secretariat.

#### *G. United Nations Industrial Development Organization (UNIDO)*

28. UNIDO has taken action to depute a staff member to the Conference secretariat.

29. It has instructed its industrial development field advisers to participate and assist, as required, in the preparation of national papers. In addition, many of the existing activities of UNIDO which fall within the agenda of the Conference are being reoriented, as appropriate, keeping in mind the aims of the Conference.

30. In view of the close interrelationship between industry and technology, the development and transfer of industrial technology has been an integral part of most UNIDO activities. It is estimated that over the past several years, development and transfer of technology activities have had a share of about 80 per cent of the technical co-operation programme of UNIDO. Over 500 experts are assigned annually to field projects in this area of work; more than 237 projects have been implemented involving general purpose of specialized sectoral institutions. Roughly two thirds of 250 working groups, workshops and seminars held by UNIDO have been related to the development and transfer of technology.

31. The accumulated experience of UNIDO will be put at the disposal of the Conference. The Co-operative Programme of Action on Appropriate Industrial Technology (ID/B/188) and resolution 47 (XI) on international co-operation in the transfer of technology,<sup>2</sup> adopted by the Industrial Development Board on 6 June 1977, together with the Lima Declaration and Plan of Action on Industrial Development and Co-operation (A/10112, chap. IV), provide the basis for the continued and effective assistance of UNIDO to developing countries in this field.

32. Attention is focused on action-oriented measures of a practical nature that (a) contribute to the building of technological capacities of developing countries for the selection, acquisition, adaptation, absorption and development of technology; (b) promote the implementation of a programme of action on appropriate industrial technology; and (c) fill gaps in the effective supply of industrial and technological information.

33. The third General Conference of UNIDO is scheduled to be held in 1979 and the preparatory activities have already commenced. It is expected that the combined result of this conference and the United Nations Conference on Science and Technology will lead to a series of international actions for the benefit of the developing countries in the field of science and technology.

#### *II. United Nations Environment Programme (UNEP)*

34. UNEP submitted to the Preparatory Committee for the Conference at its first session a paper emphasizing the role of environmentally sound and appropriate technologies in development and highlighting the importance of basic human needs as one of the topics to be considered at the Conference.

35. UNEP plans to contribute to the documentation of the Conference and to regional papers, with particular emphasis on environmental issues. UNEP will participate in all regional meetings.

36. UNEP plans to prepare a comprehensive policy paper for consideration at the Conference. The paper will deal with environmental issues and in particular with environmentally sound and appropriate technologies.

#### *I. United Nations Development Programme (UNDP)*

37. The Working Group on Science and Technology for Development of UNDP has been entrusted with the responsibility at Headquarters of co-ordinating support to the Conference. UNDP hopes to submit two papers to the Conference: "Technical Co-operation in the process of transfer, adaptation and development of technology" and the "Role of the United Nations system in the field of appropriate technology". Both papers will deal with the operational needs of

<sup>2</sup> For the text of the resolution, see *Official Records of the General Assembly, Thirty-second Session, Supplement No. 16 (A/32/16)*, annex 1.



developing countries in these areas and the ways and means by which the United Nations system may help developing countries to meet these needs. A senior consultant has already been recruited to work on the paper on appropriate technology.

38. The Administrator of UNDP has instructed all field offices to provide their utmost co-operation in the preparatory work for the Conference and has stressed two specific areas of co-operation:

(a) To facilitate the preparation of the Conference and the national papers, the Resident Representative's Office should act as the channel of communication between the Conference secretariat and any staff of the United Nations system engaged in providing assistance to Governments in the preparation of the national papers for the Conference;

(b) To meet requests of Governments and in full consultation with UNDP headquarters, UNDP offices and project personnel in the field may assist Governments in preparing their national papers, especially in identifying relevant issues and formulating policy options. The final choice, however, remains the exclusive responsibility of Governments. UNDP services should be complementary to assistance provided by the Conference secretariat and the regional commissions.

#### *J. United Nations Institute for Training and Research (UNITAR)*

39. As part of its work on problems of international co-operation and policy-making in the field of science and technology, UNITAR plans to undertake an analysis of the decision-making processes of the forthcoming United Nations Conference on Science and Technology for Development.

40. The study will have two phases. The first phase will consist of the preparation of policy papers, with particular reference to furthering international co-operation for the benefit of developing countries, which will serve as contributions to the documentation of the Conference. The second phase will be an analysis of the results of the Conference.

41. This work will be carried out in co-operation and consultation with the secretariat of the Conference.

#### *K. International Labour Organisation (ILO)*

42. The ILO is preparing an overview paper and has alerted its field personnel to assist, if so requested, in national and regional preparations for the Conference. An ILO publication on technologies for basic needs will be issued shortly.

43. The ILO is ready to second a technology expert to the Conference secretariat.

#### *L. Food and Agriculture Organization of the United Nations (FAO)*

44. FAO is prepared to co-operate to the maximum extent possible in substantive preparations for the Conference. Work is already under way to prepare the overview paper requested by the Preparatory Committee of the Conference.

45. FAO is willing to second a senior officer to the Conference secretariat to participate actively in the substantive preparations. A focal point will be designated at FAO headquarters for liaison with the Conference secretariat and to prepare background documentation in selected subject areas. The Organization is also ready to co-operate at the national and regional levels through country and regional offices as required.

#### *M. United Nations Educational, Scientific and Cultural Organization (UNESCO)*

46. In addition to the preparation of its own position papers and contributions to joint United Nations system papers, UNESCO will co-operate with Member States and regional bodies in organizing and preparing their contributions.

47. An international seminar/workshop in Madras, India, held from 1 to 10 August, was financed by UNESCO and organized by the Committee on Science and Technology in Developing Countries of the International Council of Scientific Unions. The resulting report, entitled "Suggestions for the preparation of national papers", is addressed mainly to developing countries.

48. UNESCO will provide intellectual and financial support for national and international seminars to be organized in Egypt, India, Iran, Norway and Thailand, as well as in other regions.

49. Following agreements with regional commissions, UNESCO expects to provide financial and intellectual support for their regional co-ordinating roles. UNESCO is also soliciting and organizing contributions from developed countries for the preparation of national papers.

50. Two senior officers and supporting staff have been appointed at headquarters to co-ordinate the activities of UNESCO, which will designate a staff member to join the Conference secretariat.

*X. World Health Organization (WHO)*

51. As part of its commitment to technical co-operation, WHO assists Governments through their ministries of health, if and when requested, in the examination of health aspects in their national analysis which impede development and which may be solved with the help of science and technology. The WHO special programme for research and training in tropical diseases is an example of a major health sector activity for possible WHO involvement in this field. WHO country representatives and regional offices are ready to co-operate with national health authorities concerned in Conference preparations.

*O. International Bank for Reconstruction and Development (IBRD)*

52. The World Bank plans to submit, early in 1978, an account of the Bank's general approach to science and technology in its regular operations and an account of special initiatives in this field.

*P. International Telecommunication Union (ITU)*

53. The International Telecommunication Union has contacted Member States concerning preparations for the Conference and, as a result, requests for expert advice were addressed to the Union. In consequence, arrangements were made between ITU and the secretariat of the Conference to make such advice available, which, *inter alia*, would give appropriate attention to the subject of telecommunications in the preparation of national papers.

*Q. World Meteorological Organization (WMO)*

54. Although WMO has participated in some of the planning meetings for the Conference, the nature and full extent of its contribution cannot be determined until the subject areas to be discussed at the Conference have been selected.

*R. Inter-Governmental Maritime Consultative Organization (IMCO)*

55. The Council of the Inter-Governmental Maritime Consultative Organization, at its thirty-seventh session, authorized IMCO to participate actively in the preparatory work for the Conference, particularly if transport were selected among the subject areas and maritime transport were to be included under this general heading.

*S. World Intellectual Property Organization (WIPO)*

56. Since August 1977, WIPO has put at the disposal of the Secretary-General of the Conference a Professional member of his secretariat, paid from the WIPO budget. Jointly the Executive Secretary of ECLA and the Secretary-General of the Conference, the Director-General of WIPO convened at Mexico City, on 26 to 28 October 1977, in the context of the first phase of the preparatory work of the Conference, a Latin American technical seminar on technological information from patent documents. Similar meetings are being planned in other regions. WIPO is contributing financially and substantively to the ESCAP newsletter on the preparations for the Conference.

*T. International Atomic Energy Agency (IAEA)*

57. The Agency's plans relating to the preparatory work of the Conference can be finalized only when the choice of sectoral subject areas is known, especially if energy is selected. The Agency is ready to co-operate fully at all stages of the Conference preparations.

UNITED NATIONS GENERAL ASSEMBLY,  
November 8, 1977.

Thirty-second session, Agenda item 73.

UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

*Report of the Secretary-General*

*Addendum*

1. The following data supplement the information contained in section III of the Secretary-General's report (A/32/230).

2. At the African regional meeting convened by the Economic Commission for Africa at Arusha, United Republic of Tanzania, from 3 to 8 October 1977, in which the Secretary-General of the Conference participated, the following subject areas were selected:

(a) Agriculture: research, development and use of improved agricultural techniques for traditional and new crops and post-harvest conservation techniques;

(b) Housing: the acquisition and use of technical knowledge for the production of low-cost houses;

(c) Health: the collection, development and utilization of traditional and scientific knowledge related to the use of medicinal plants for human and animal diseases prevalent in Africa;

(d) Transport: the improvement and expansion of transport and communication networks and services in Africa;

(e) Energy: the development, use and conservation of energy, with special reference to non-conventional sources of energy for development.

3. At the Latin American regional meeting convened by the Economic Commission for Latin America at Mexico City from 31 October to 2 November 1977, in which the Secretary-General of the Conference participated, the following subject areas were selected:

(a) Food: includes agricultural technology, human nutrition, fishing and food processing;

(b) Production of capital goods;

(c) Communications and transportation;

(d) Health and pharmaceutical industry;

(e) Rational management of natural resources renewable and non-renewable.

UNITED NATIONS GENERAL ASSEMBLY,

November 10, 1977.

Thirty-second session, Fifth Committee, Agenda item 100.

#### PROGRAMME BUDGET FOR THE BIENNIUM 1978-1979

*Revised estimates under section 4, section 25 and income section 1 in respect of the United Nations Conference on Science and Technology for Development*

#### *Report of the Secretary-General*

#### I INTRODUCTION

1. Under section 4 of his proposed programme budget for the biennium 1978-1979, the Secretary-General submitted initial estimates for the Conference on Science and Technology for Development which the General Assembly by resolution 31/184 of 21 December 1976, had decided to convene during 1979.

2. In submitting these estimates, it was pointed out that they did not reflect the results of the deliberations of the Preparatory Committee for the Conference at its first special session. Therefore, the submission was confined basically to the estimates incorporated in the original statement of financial implications (A/C.5/31/89), which had been submitted to the General Assembly at its thirty-first session.

3. In its related report,<sup>1</sup> the Advisory Committee on Administrative and Budgetary Questions, on the understanding that the estimates for the Conference were provisional and that revised estimates would be presented to the General Assembly at its thirty-second session, recommended deletion of the provisional estimates pending the submission of such revised estimates.

4. The revised estimates submitted in the present document reflect the latest stage of developments.

#### II. BACKGROUND TO THE CONFERENCE

5. In August 1974, at its fifty-seventh session, the Economic and Social Council, in its resolution 1897 (LVII), established an Intergovernmental Working Group

<sup>1</sup> Official Records of the General Assembly, Thirty-second Session, Supplement No. 8 (A/32/8).

<sup>2</sup> *Idem.*, Supplement No. 8 (A/32/8), paras. 4-9.

of the Committee on Science and Technology for Development (CSTD) and requested it to consider the objectives, topics and agenda for a conference on science and technology and to report its findings to CSTD. The Working Group reported to CSTD in 1975.<sup>4</sup> On 16 September 1975, the General Assembly adopted resolution 3362 (S-VII), in which, in section III, paragraph 7, it decided that a United Nations Conference on Science and Technology should be convened and stated its main objectives.

6. The question of the Conference was considered by the Committee on Science and Technology for Development in February 1976 at its third session, and its recommendations were endorsed by the Economic and Social Council at its sixty-first session in its resolution 2028 (LXI) and 2035 (LXI). The Committee for Programme and Co-ordination (CPC), in the course of its review of the medium-term plan for 1978-1981<sup>4</sup> at its sixteenth session (10 May-11 June 1976), also made several comments in relation to the Conference.

7. In its resolution 2028 (LXI), the Council recommended an additional objective for the Conference and endorsed the proposed agenda and plan for the preparatory period which is contained in annex I to the present report.

8. By the same resolution the Council (a) requested the Committee on Science and Technology for Development to act as the Preparatory Committee for the Conference, which would be open to participation by all States; (b) recommended the appointment at the earliest possible time of a Secretary-General of the Conference to head a secretariat of the Conference; (c) endorsed the system-wide scope of the Conference and recommended that competent bodies and organizations should depute high-level specialists to the secretariat of the Conference in order to provide substantive support and links with the various bodies and organizations; (d) invited the Secretary-General to request the Administrative Committee on Co-ordination to promote, through its Sub-Committee on Science and Technology, close and permanent contact with the Secretary-General of the Conference; (e) requested that for the preparatory work leading to the Conference, the Advisory Committee on the Application of Science and Technology to Development should advise, on request, the Secretary-General of the Conference and the Preparatory Committee on matters pertaining to the Conference and assist and collaborate, at the request of the Secretary-General of the Conference, in the preparation of the Conference at the regional level; (f) recommended that, in accordance with the national development efforts, the scientific and technological content of the agenda should be integrated with its economic and social intent and that the science and technology units of the regional commissions should be strengthened, so that they might participate actively in the preparation and organization of the regional meetings to be held prior to the Conference; and (g) endorsed the co-operation of intergovernmental and non-governmental organizations.

9. By its resolution 2035 (LXI), the Council (a) requested the Secretary-General of the Conference to prepare, as a matter of urgency, a programme of work for the various stages of the preparatory period for the Conference, giving attention to specified criteria which included the function of providing, on specific request and, to the extent possible, technical support for the preparation of national papers; (b) recommended that the Secretary-General of the Conference include in this programme plans for seminars, travelling seminars and specialized task forces to supplement national efforts and also at the regional and inter-regional levels; (c) requested the Preparatory Committee at its first session to establish the guidelines for the preparation of national papers and to finalize the detailed programme of work for the preparatory period for the Conference; (d) recommended that the secondment of personnel from the various parts of the system should be arranged by the Secretary-General of the Conference and the executive heads; (e) recommended that adequate provision should be made in the Conference budget for these arrangements, particularly as they apply to developing countries; and (f) called on the governing bodies of the various organizations concerned to make the necessary provision to enable their organizations to participate to the fullest extent possible in the work of the Conference.

10. In October 1976, at its sixty-eighth session, the Administrative Committee on Co-ordination agreed (a) that a new "system-wide approach" should be used in the preparations for the Conference in order to enable organizations of the

<sup>4</sup> E/C.8/28, chaps. I and III.

<sup>4</sup> *Official Records of the General Assembly, Thirty-first Session, Supplement No. 6A (A/31/6/Add.1, vols. I and II and corrigenda 1 to 4).*

system to provide the necessary input to the Conference and to mobilize the technical resources in this system-wide endeavour; (b) that an attempt should be made to obtain a complete picture of the total resources required for the Conference, together with an indication of the sources of the funds; and (c) that the Conference budget should include provisions for resources which the secretariat of the Conference would require in order to obtain special services from organizations of the system in relation to the subject areas to be selected.

11. The resources earmarked by individual organizations of the system to ensure their participation in the Conference were indicated to the General Assembly at its thirty-first session in document A/C.5/31/89, annex III.

12. At the same session, the General Assembly, by its resolution 31/184 of 21 December 1976, endorsed the recommendations contained in the Economic and Social Council resolutions 2028 (LXI) and 2035 (LXI) and further decided that the Conference should be convened in the summer of 1979, in order that its results might be acted upon by the Assembly at its thirty-fourth session.

13. At the first session of the Preparatory Committee, held from 31 January to 14 February 1977, detailed decisions were adopted on the programme for work for the preparatory period of the Conference. This programme included plans and appropriate guidelines for the preparation of national papers. Also approved were plans for the convening of regional meetings by each regional commission in the second half of 1977 and in mid-1978 and for the submission of regional papers to the Preparatory Committee in September 1978 at its third session. The Preparatory Committee also dealt with input from the United Nations system as a whole, the possibility of an interregional meeting during the latter stages of the preparatory process, the participation of intergovernmental organs and non-governmental organs, and the scope of the documentation to be made available to the Conference. It established the calendar for the preparatory period and reviewed the resources which might be required to carry out the mandates of the General Assembly. In this regard, concern was expressed about the limited financial provision for advisers to assist developing countries in the preparatory work at the national stage. The Preparatory Committee also agreed on the need to put together a strong Conference secretariat. The programme of work and the calendar for the Conference as adopted by the Preparatory Committee at its first session are provided in annex II to this paper.

14. The Committee for Programme and Co-ordination, at its seventeenth session,<sup>5</sup> noted that arrangements were being made for officials from some organizations to join the secretariat of the Conference. Members of the Committee emphasized that particularly at the more senior levels, the secretariat should be established with due regard to the principle of equitable geographical distribution. The Committee was informed that such principle had been adhered to in filling the three posts at the D-1 level which had been approved by the Advisory Committee on Administrative and Budgetary Questions.

15. Concern was also expressed by CPC that certain organizations of the United Nations systems, particularly those linked to the work of the Conference, did not seem to have made budgetary provision for the necessary preparatory work.<sup>6</sup> As regards the United Nations, the proposed programme budget for 1978-1979, indicated that the United Nations Industrial Development Organization (UNIDO) and the United Nations Conference on Trade and Development (UNCTAD) would render services to the Conference in the context of programme element (IV) (c) of the transfer of technology programme,<sup>7</sup> and programme element 55 of the industrial studies programme,<sup>8</sup> respectively. At the same time, it was not considered necessary to request additional resources specifically for these purposes. With regard to other organizations, the Secretary-General has received confirmation recently that they stand by their intent as set out in annex III of document A/C.5/31/89, but no information has been received on contributions to the Conference which would constitute pledges of support over and above those expressed in that document.

16. The Economic and Social Council at its sixty-third session, took note of the report of the Preparatory Committee<sup>9</sup> and in its resolution 2123 (LXIII) urged the Secretary-General and the executive heads of the agencies and organizations concerned to ensure co-ordination of the preparatory activities of the Conference.

<sup>5</sup> A/32/38, paras. 287-291.

<sup>6</sup> A/32/38, para. 287.

<sup>7</sup> A/32/3, vol. II, para. 11A.32

<sup>8</sup> *Idem*, para. 12.65.

<sup>9</sup> A/32/43.

By the same resolution, the Council (a) called on the Secretary-General to submit to the Advisory Committee on Administrative and Budgetary Questions, at the earliest possible time, a request for any further resources required in 1977 to ensure the earliest possible implementation of paragraphs 5 and 6 of Economic and Social Council resolution 2035 (LXI), together with his most up-to-date assessment of the resources required to assist Governments with the preparation of their national papers; (b) recommended that for the biennium 1978-1979 sufficient resources be allocated to the Conference secretariat, specialized agencies and the other bodies of the United Nations system concerned to ensure appropriate preparation of the Conference; (c) called upon the Secretary-General to propose to the General Assembly, at its thirty-second session, the provision of adequate personnel for the Conference secretariat, with due regard to the principle of equitable geographic distribution; and (d) called upon the Secretary-General to delineate the specific responsibilities of the Office for Science and Technology, as well as the responsibilities of personnel seconded from UNCTAD and UNIDO and from organizations in the United Nations system other than the United Nations. These various responsibilities are indicated in annex III to the present report.

### III. ESTIMATED COST OF THE CONFERENCE

17. The Secretary-General has submitted financial implications at each stage of the development of plans for the Conference. Thus, such submissions have been made to the Committee on Science and Technology for Development at its third session in documents E/C.S/41 and Add 1 and E/C.S/L.70, to the Economic and Social Council at its sixty-first session in document E/5855, to the General Assembly at its thirty-first session in document A/C.2/31/13 and A/C.5/31/59, to the Committee on Science and Technology for Development, acting as the Preparatory Committee for the Conference, in February 1977, at its first special session in document E/C.S/L.85, to the Advisory Committee on Administrative and Budgetary Questions in April 1977 in accordance with the provisions of General Assembly resolution 3540 (XXX) on unforeseen and extraordinary expenses for the biennium 1976-1977 and to the Economic and Social Council in June 1977 at its sixty-third session in document E/AC.6/L.601.

18. All of the preceding estimates have been tentative and based on assumptions derived from the initial recommendations of the Committee on Science and Technology for Development in February 1976 and of the Economic and Social Council in its resolutions 2028 (LXI) and 2035 (LXI). The revised estimates submitted in the present report reflect the latest position in this regard, taking into account especially the recommendations of the Preparatory Committee in its report<sup>19</sup> to the Economic and Social Council at its most recent session and by the recommendations of the Council in its resolutions 2123 (LXIII).

#### CONFERENCE SECRETARIAT (\$1,780,400)

19. In these revised estimates, the proposed staffing requirements for the secretariat of the Conference have been kept to the absolute minimum required for the effective implementation of the mandates in the various resolutions establishing the organization and programme of the Conference.

20. The original estimates, as submitted to the General Assembly at its thirty-first session in document A/C.5/31/59, annex I, envisaged the need for 11 Professional and 7 General Service staff on the assumption that the Office of Science and Technology would make an additional P-5 staff member available on a full-time basis, as well as the services of a D-2 for part of the time. In the intervening period it has become clear that the workload imposed by paragraphs 5 and 6 of ECOSOC resolution 2035 (LXI), as endorsed by Economic and Social Council resolution 2123 (LXIII), necessitates additional Professional staff to cope with the extensive assistance which would have to be provided at the national level, as well as the organization and planning of regional seminars and meetings. Accordingly, it is currently estimated that a total staff of 23 (14 Professional and 9 General Service) will be required, as indicated in annex IV, page 1.

21. The 11 Professional posts indicated in the original presentation (A/C.5/31/59, annex T), consisted of one post at the Under-Secretary-General level to accommodate the Secretary-General of the Conference, one D-2 post for a Deputy, one D-1, five P-5, two P-4 and one P-3 which, it was anticipated,

<sup>19</sup> A/32/48.

would be required at progressive stages. On the recommendation of the Advisory Committee on Administrative and Budgetary Questions, the General Assembly, at its thirty-first session provisionally approved only the Under-Secretary-General post and one D-1 post for 1977. After considering a subsequent submission by the Secretary-General in accordance with the provisions of General Assembly resolution 3540 (XXX) on unforeseen and extraordinary expenses for the biennium 1976-1977, the Advisory Committee approved five additional Professional posts for 1977 comprising two new D-1 posts which were not envisaged for in document A/C.5/31/89, two P-5 posts for a special assistant to the Secretary-General of the Conference and for an officer responsible for agenda item 4 of the Conference, respectively, and one P-4 post for an administrative officer. In the present revised estimates for 1978-1979 seven additional posts have been proposed: the D-2 post for a Deputy, previously envisaged, three P-5 posts for officers responsible for Conference agenda items 1, 2 and 3, two P-4 posts for a scientific co-ordinator and a scientific editor, respectively, and one P-2 post for a documents and associate administrative officer.

As a result, the total proposed staffing of the Conference secretariat for the 1978-1979 biennium would consist of 14 Professional posts, as compared to the 11 such posts envisaged in document A/C.5/31/89. The increase, as compared to the position indicated in the latter document, relates specifically to the two new D-1 posts, the new P-4 post for the scientific editor and the P-2 post referred to above. The function of the special assistant to the Secretary-General, which was proposed at the P-3 level in document A/C.5/31/89, is resubmitted at the P-5 level, since the qualifications required are of a much more responsible level than originally envisaged. The post of administrative officer, on the other hand, which was included in document A/C.5/31/89 at the P-5 level, has been reduced to the P-4 level, thus maintaining the same number of P-5 posts as originally proposed. Finally, one of the two P-4 posts for officers with co-ordinating functions which were originally proposed has been deleted, thus bringing the net increase of Professional posts to three, as compared with document A/C.5/31/89.

22. In view of the very heavy workload which has arisen in respect to documentation as a result of the increased emphasis by the Preparatory Committee on the preparatory period, it is proposed that nine General Service staff instead of seven should be provided for.

23. The total cost of the proposed secretariat of the Conference is estimated at \$1,789,400 for the biennium 1978-1979. A detailed description of the individual functions involved is provided in paragraphs 24 to 32 below.

#### *Deputy Secretary-General of the Conference*

24. It was envisaged from the outset that a Deputy Secretary-General of the Conference at the D-2 level would be required to assist the Secretary-General of the Conference in carrying out his responsibilities for maintaining high-level contacts with Governments, United Nations agencies and other intergovernmental and non-governmental organizations. Such a function has been provided for in the case of other recent major conferences of the United Nations. It was originally assumed that it might be possible that this function could be performed on a half-time basis. Subsequent development in the Preparatory Committee, however, made it clear that full-time duties were involved. Accordingly, the provision for such a post was included in a submission last April to the Advisory Committee on Administrative and Budgetary Questions. The Advisory Committee was not convinced, however, that a full-time Deputy was required at that stage and deferred its decision. At the sixty-third session of the Economic and Social Council several delegations expressed regret that the decision on the post had been deferred and urged that it be established as soon as possible.<sup>21</sup> Accordingly, the proposal for a full-time Deputy at the D-2 level has been repeated in the present submission.

#### *Principal officers (D-1)*

25. The following three officers would share the work at the D-1 level:

(a) The Executive Secretary of the Conference: seconded from the Office for Science and Technology but paid out of the Conference budget, to be responsible for the management of personnel and other day-to-day matters, as well as co-ordination of the work of the Conference secretariat.

<sup>21</sup> E/AC.6/SR.702, para. 10.

(b) The principal scientific co-ordinator: seconded from the Office for Science and Technology but paid out of the Conference budget, to be responsible for the co-ordination, at the country level, of activities related to the preparation of national papers, particularly with regard to contributions by United Nations organizations, other intergovernmental organizations and non-governmental organizations.

(c) The principal liaison officer: assigned to the Conference secretariat by agreement between the United-Secretary-General in charge of the Department of Economic and Social Affairs and the Secretary-General of the Conference, while remaining a member of the Office for Science and Technology and thus involving no financial implications for the Conference budget. The function of this officer is to ensure close links between the work carried out by the Conference secretariat and the work being done in the Department of Economic and Social Affairs, and to be responsible, *inter alia*, for the necessary inter-relationships between the scientific-technical field and the economic areas, as called for in paragraph 10 of General Assembly resolution 32/184.

#### *Senior officers (P-5)*

26. Five officers would share the work at the P-5 level:

(a) The special assistant to the Secretary-General of the Conference: the main responsibilities of this officer are to maintain continuous contact with delegations and other representatives of Governments, in accordance with paragraph 3 of Economic and Social Council resolution 2123 (LXIII) and, in addition, to maintain liaison with United Nations units in the non-economic and social areas, for example, political affairs, disarmament and outer space.

(b) The other four senior officers will each be directly responsible for the preparation of the discussion paper on one of the four agenda items described in annex I. This responsibility will involve a thorough study of the national papers contributed to the Conference, as well as of relevant documents contributed by intergovernmental organizations and non-governmental organizations, in order to extract from these submissions the essence of the material to be presented under the relevant agenda of the Conference. The officer responsible for item 4 will, at the same time, have responsibility for the provision of secretariat services to the expert panel and its subgroups which have been entrusted with the preparation of a report on the subject involved.

#### *Scientific co-ordinator (P-4)*

27. In document A/C.5/31/80, the need was envisaged for two P-4s with co-ordinating functions. In the present submission, only one P-4 is requested for an officer who will assist the principal scientific co-ordinator in co-ordinating, at the country level, activities for the preparation of national papers, with particular emphasis on the input of intergovernmental organizations and non-governmental organizations.<sup>12</sup>

#### *Scientific editor (P-4)*

28. It is expected that a large volume of highly technical documentation will need to be prepared for the Conference by the secretariat, the regional commissions, intergovernmental bodies and Governments. In order to maintain a high and consistent standard of presentation of technical scientific material, a scientific editor is required to review, edit and, where necessary, redraft the technical aspects of papers and reports prepared for the Conference. In addition, the scientific editor will assist the Secretary-General in the preparation of speeches, articles and other material which may be required to generate the interest of Governments and the scientific community in the Conference.

#### *Administrative officer (P-4)*

29. The administrative officer will be responsible for the financial/administrative aspects of the Conference secretariat, including the recruitment of technical experts and consultants. In addition, he will be involved with arrangements with the host Government concerning the holding of the Conference.

#### *Documents and associate administrative officer (P-2)*

30. In view of the large volume of requests for technical experts, there is an urgent need for a junior administrative officer, who will be primarily concerned with the recruitment, travel and other arrangements for the placement of experts in the field. The incumbent would also be required to (a) handle the administra-

<sup>12</sup> General Assembly resolution 31/184, para 13.



tive arrangements for seminars in various locations; (b) arrange for the processing of the large volume of documentation which it is anticipated will be submitted by the regional commissions, agencies in the United Nations system, non-governmental organizations, intergovernmental organizations and the national Governments; and (c) establish a system of controls for the receipt, custody and issuance of the various documents, as well as for the organization of a documents reference centre.

#### *General Services staff*

31. In this category, nine staff members (2 G-5 and 7 G-4/1) will be required to provide secretarial, typing and related services to assist the Professional staff of the Conference secretariat, technical advisers, consultants and staff members assigned to the Conference from the agencies.

#### REGIONAL COMMISSIONS: TEMPORARY ASSISTANCE (\$400,500)

#### *Professional and local level staff*

32. In the original estimates, as contained in document A/C.5/31/89, it was anticipated that eight work-months of temporary assistance at the P-4 level and eight work-months at the local level would be required for each of the regional commissions located in the developing countries in order to assist in the preparation of regional papers and the holding of regional meetings. At its spring session, the Advisory Committee on Administrative and Budgetary Questions approved the provision of six work-months at the P-4 level and six work-months at the local level for each commission. It was originally foreseen that such assistance would be required for only four months in 1978, but it is now considered that the emphasis which has been placed on regional activity during the preparatory period will make it necessary to maintain this temporary assistance through the end of 1978.

#### *Regional advisers*

33. In addition, in document A/C.5/31/89 the need was envisaged for 40 work-months in 1977 and 80 work-months in 1978-1979 of regional advisers in the regional commissions in order to provide assistance to the developing countries in their national reviews of the application of science and technology to development and in the preparation of their national papers. At the first session of the Preparatory Committee, in view of the emphasis placed on the preparation of the national papers, many delegations suggested<sup>13</sup> that the provision for 80 work-months in 1977-1979 was inadequate and that, in order not to jeopardize the preparations for the Conference, this provision should be doubled.

34. In reviewing the requirements for regional advisers in the light of these developments, the Secretary-General found it necessary to make a distinction between two functions: on one hand, the function of assisting the regional commissions pursuant to paragraph 8(b) of Economic and Social Council resolution 2028 (LXI) in preparing and organizing the regional meetings and in co-ordinating on a regional level the national efforts including, but not limited to, the preparation of national papers, and, on the other, the function of directly assisting national Governments by means of technical support for the preparation of their national papers. It was also deemed essential for a speedy processing and response to the governmental requests for assistance that the advisers carrying out the latter function should be administered centrally at United Nations Headquarters.

35. Accordingly, in the present report, the Secretary-General is limiting the request for regional advisers to a provision of 36 work-months in order to assist the regional commissions located in the developing countries in co-ordinating their national efforts for the Conference. The estimates include travel of these advisers within the regions for consultations with Governments. It is expected that the advisers would make at least three trips, in the case of ECLA and ECWA, and six trips, in the case of ESOAP and ECA. While no provision has been made for regional advisers at ECE, it is expected that the staff of the Commission would, in connection with UNCSTD, be required to make several trips within the region.

#### TECHNICAL ADVISERS (\$600,000)

36. The second function referred to in paragraph 35 above and which relates to direct assistance at the national level, involves task forces and individual ex-

<sup>13</sup> A/32/48, para. 47.

perts to be assigned in response to requests from Governments in accordance with paragraphs 1 (d) and 5 of Economic and Social Council resolution 2035 (LXI) and is reiterated by resolution 2173 (LXIII). The specialists performing these functions are referred to in this report as "technical advisers" to distinguish them from the regional advisers assigned directly to the commissions. As noted in the above paragraph, the technical advisers would be administered from United Nations Headquarters.

37. It is proposed that the 100 work-months which were projected for this purpose in 1978-1979 in the submission to the Advisory Committee on Administrative and Budgetary Questions in April 1977 under resolution 3540 (XXX) on unforeseen and extraordinary expenses should be maintained. However, while in the submission to the Advisory Committee, it was anticipated that the recruitment of these advisers would be possible at the L-5 level; experience to date indicates that the level of L-6 has to be offered if the services of top-level experts with the required knowledge and experience are to be secured. The estimated costs for technical advisers have been revised accordingly, bringing the recruitment level into line with that used for regional advisers stationed at the regional commissions.

#### TRAVEL AND SUBSISTENCE (\$203,800)

38. The Secretary-General of the Conference will be required to undertake extensive travel to all the regions for consultations with Governments, attendance at the regional preparatory meetings and at intergovernmental meetings. In addition, limited travel would be undertaken by the Deputy Secretary-General in the performance of his negotiating functions as described above and by other staff in connexion with Conference activities. The cost of such travel is estimated at \$105,000 for 1978-1979.

39. In addition, it is estimated that a total of \$98,800 will be required for the travel and subsistence of experts and representatives of national liberation movements.

#### CONSULTANTS AND CONTRACTORS (\$380,800)

##### A. Headquarters (\$290,000)

40. The appropriation requested for fees, travel and subsistence in respect of consultants at Headquarters covers the following requirements:

(a) Five consultants each specializing in one of the following subjects:

- (i) Economic planning;
- (ii) Assessment of social implications of introducing technology;
- (iii) Science and technology as part of economic and social policy;
- (iv) Acquisition of technology from abroad; and
- (v) Technological forecasting.

(b) In addition, consultancy services would be required for the preparation of technical background documentation in connexion with the agenda items, including an overview paper on the United Nations system of science and technology with respect to socio-economic development and a review of recent United Nations conferences highlighting the role of science and technology. This undertaking would require eight work-months of consultants.

(c) It is envisaged that \$200,000 will need to be devoted for that part of the preparatory period which will follow the selection by the Preparatory Committee at its second session (23-27 January 1978) of the five conference subject areas. It is from these five sectoral subject areas that concrete examples illustrating the analyses presented in regional and national papers will need to be drawn. Agencies with sectoral mandates have not made adequate provision in their budgets to cover the resulting degree of involvement if a subject area within their sector were to be chosen and would not be in a position at that late stage to secure the necessary budgetary provision. Accordingly, the revised estimates submitted in the present report include a tentative allocation of \$40,000 per subject area as a contribution towards the cost of special studies or expert group meetings to be organized by those organizations which find themselves more deeply involved than anticipated as a result of the choice finally made.

##### B. Regional commissions (\$90,800)

41. The appropriation requested for consultants at the regional commissions for the purpose of assisting in the preparation of regional background papers is based on four work-months in 1978-1979 at each of the commissions and comprises fees, as well as the cost of travel in the areas in which the consultants serve.

## SEMINARS (\$211,000)

42. The Economic and Social Council, in its resolution 2123 (LXIII) of 4 August 1977, requested that the necessary resources be provided to the Conference secretariat in order to assist Governments in the organization of seminars and task forces at all levels, as recommended in its resolution 2035 (LXI), and that adequate resources be made available so as to ensure full participation in these national and regional seminars by experts from developing countries.

43. The various seminars planned for 1977 and 1978 are indicated in detail in a separate report submitted to the General Assembly at its current session (A/32/230, para. 10). It is expected that, in view of the interest shown by the developing countries, that the number of seminars to be held in 1978 will increase. The related planning is currently being finalized.

## INFORMATION ACTIVITIES (\$290,400)

44. In view of the proposed format of the Conference and the great importance which the 1975 Intergovernmental Working Group and the Committee on Science and Technology for Development attached to the activities to be undertaken in the various regions during the preparatory period, a well-balanced programme of public information would seem to be called for during the preparatory period, as well as during the Conference proper. While the Conference is to be a Conference of Governments, its objectives—if it is to have any serious impact—require the support of the scientific communities, as well as of the general public, in the various countries. Thus considerable care must be taken to explain, to the public in developed and developing countries alike, the purposes, potential, activities and results of the Conference.<sup>14</sup>

45. Information coverage of the Conference proper and of the meeting of the preparatory body would be provided by the Office of Public Information (OPI) as part of its normal activities, on the understanding that the Conference will be held at Headquarters.

46. The programme of activities that should be undertaken with a view to acquainting the public with the aims of and issues before the Conference has been prepared in co-operation with the Centre for Economic and Social Information of the Office of Public Information. This programme, as described in more detail in paragraph 48 to 50 below, has the following two basic objectives:

(a) To create public awareness and understanding of the possibilities and implications of the application of science and technology to development;

(b) To stimulate interest in the Conference, as well as in the preparatory activities, particularly at the national and regional levels.

## A. INFORMATION ACTIVITIES AT THE INTERNATIONAL LEVEL (\$116,800)

*Publications (\$21,300)*

47. It is planned to issue the following publications:

(a) A 6-page brochure, to be widely distributed, explaining the "who, what, where, when and how" of the Conference;

(b) A 60-page booklet, to be produced at an early stage, giving a broad picture of the issues involved;

(c) Periodic issues of the single-sheet FACT series issued by the Office of Public Information;

(d) Feature articles at the expert level, to be produced by the Centre for Economic and Social Information of the Office of Public Information in co-operation with experts involved in the preparation of the Conference.

*Journalists' encounter and NGO forum (\$95,500)*

48. It is planned to organize the following:

(a) One journalist's encounter to be held at the time of the Conference bringing together science and/or economics editors to discuss relevant issues with a panel of prominent experts.

<sup>14</sup> The 1975 Intergovernmental Working Group, owing to the limited time at its disposal, did not enter into the question of information activities related to the Conference. However, the Committee on Science and Technology for Development, at its third session was provided with data on this subject, as part of the Secretary-General's paper on the costs of the Conference (E/C.S.41 and Add.1), and heard statements by representatives of the Office of Financial Services and the Office of Public Information.

(b) In co-operation with major scientific non-governmental organizations (NGOs) in consultative status with the Economic and Social Council, an NGO forum to facilitate the active participation of non-governmental organizations in the preparatory process.

#### B. INFORMATION ACTIVITIES AT THE REGIONAL LEVEL (\$60,000)

49. The regional information activities would comprise activities comparable to those at the international level but geared to matters arising from, or of particular interest to, the respective regions. This programme would comprise publications and activities to encourage regional and local press features and radio and audio-visual presentations. The total cost of these activities is estimated at \$30,000. In view of the importance attached to the "consciousness-raising" aspects of the Conference and the related preparatory activities, it is also suggested that regional essay contests be held, with the winners being invited to take part in study tours organized by the United Nations. The cost of this project is estimated at \$30,000.

#### C. CENTRE FOR ECONOMIC AND SOCIAL INFORMATION (\$118,000)

50. In order to implement the above information programme and also deal with day-to-day information needs, the Centre for Economic and Social Information in the Office of Public Information will require an information officer at the P-4 level to be outposted to the Conference secretariat. The proposed appropriation provides for this information officer and a secretary, for a period of 21 months each.

#### *Conference servicing costs (\$1,300,300)*

51. As noted in paragraph 4.38 of the proposed programme budget for the biennium 1978-1979, conference servicing requirements in respect of all meetings and conferences at Headquarters and Geneva are provided for separately under section 22D and H and section 23A and B. The estimates of the 1978-1979 conference servicing requirements for the Conference provided in this submission is for purpose of information only at this stage. These estimates have been prepared on a "full-cost" basis, in the sense that all incremental costs arising for the holding of the Conference have been regarded initially as non-absorbable. To the extent that additional appropriations may be required for this Conference, these will be reflected in the "wrap-up" paper constituting a revised estimate under sections 22 and 23 which will be submitted to the General Assembly at the end of each session during the next biennium.

#### SUMMARY OF TOTAL ESTIMATED COSTS DURING THE BIENNIUM 1978-1979

52. As described in paragraphs 19 to 52 above, total revised requirements for the Conference on Science and Technology for Development in the biennium 1978-1979, exclusive of conference servicing costs, are estimated at \$3,981,500. The basis for these calculations is indicated in more detail in annex IV to this report.

53. Accordingly an appropriation in the amount of \$3,981,500 is requested under section 4. An additional appropriation of \$756,000 would be required for staff assessment under section 25, offset by an increase in the same amount in the estimates of income from staff assessment under income section 1.

#### *Summary of the total estimated costs during the period 1977-1979*

54. In order to provide the General Assembly with a perspective on the evolution of the estimates of the cost of the Conference, table 1, which follows below, provides a comparison among (a) the tentative estimates submitted in document A/C.5/31/89 to the General Assembly at its thirty-first session; (b) the revised estimates subsequently submitted to the Advisory Committee in June 1977, in accordance with the provisions of General Assembly resolution 3540 (XXX) of unforeseen and extrabudgetary expenses for the biennium 1978-1979; (c) the estimates included under section 4 of the proposed programme budget for the biennium 1978-1979 (A/32/6); and (d) the revised estimates provided in the present submission and which reflect the most recent recommendations of the Preparatory Committee and resolution 2123 (LXIII) of the Economic and Social Council.

TABLE 1

	A/C.5.31/89			Submission to ACABQ in April 1977 under General Assembly resolution 3340 (XXX)			Proposed program budget			Revised estimates		
	1977	1978-79	Total	1978-79	1978-79	(A/32/6)	Total	1977	1978-79	1977	1978-79	Total
Conference secretariat:												
Temporary assistance.....	402.3	1,129.7	1,532	285.9	1,385.3	1,671.2	1,053.1	285.9	1,587.6	285.9	1,587.6	1,873.5
Related costs.....	93.3	115.7	209	56.7	156.2	212.9	119.8	56.7	201.8	56.7	201.8	258.5
Regional commissions. Temporary assistance (professional and local level staff and regional advisers).....	338.2	592.8	931	105.6	155.3	261.9	718.3	105.6	409.5	105.6	409.5	516.1
Technical advisers.....				250.0	452.0	792.0		250.0	650.0	250.0	650.0	910.0
Travel and subsistence:												
Headquarters staff.....	25.0	105	130	25.0	105.0	130.0	129.9	25.0	105.0	25.0	105.0	130.0
Experts for the meeting on science and technology and the future.....				26.7	79.7	105.4		26.7	59.4	26.7	59.4	86.1
Experts from least-developed countries.....					31.2	31.2	28.0		27.8		27.8	27.8
Representatives of national liberation movements.....					16.4	16.4			11.6		11.6	11.6
Consultants and contractors.....												
Headquarters.....	50.0	330	380	10.0	330.0	340.0	83.8	10.0	290.0	10.0	290.0	300.0
Regional commissions.....	141.0	166	307	53.1	148.0	201.1	275.6	53.1	90.8	53.1	90.8	143.9
Seminars.....									241.6		241.6	241.6
Information activities.....		667	667		412.0	412.0	667.3		296.4		296.4	296.4
Subtotal.....	1,049.8	3,106.2	4,156	814.0	3,360.1	4,174.1	3,075.8	814.0	3,981.5	814.0	3,981.5	4,795.5
Conference servicing costs:												
Regional meetings.....	141.8	393.2	535	96.0	323.0	419.0	393.3	96.0	412.0	96.0	412.0	508.0
Expert group meetings.....	44.2	97.8	142	17.5	19.1	36.6	40.4	17.5	65.8	17.5	65.8	83.3
Preparatory committee.....	53.6	147.4	201	53.6	147.4	201.0	147.4	53.6	214.8	53.6	214.8	268.4
The Conference.....		451	451		346.4	346.4	451.0		521.9		521.9	521.9
Common services for meetings.....									85.8		85.8	85.8
Subtotal.....	239.6	1,089.4	1,329	167.1	835.9	1,093.0	1,032.0	167.1	1,300.3	167.1	1,300.3	1,467.4
Total.....	1,289.4	4,195.6	5,485	981.1	4,195.0	5,177.1	4,107.8	981.1	5,281.8	981.1	5,281.8	6,262.9

<sup>1</sup> Approved by the Advisory Committee on Administrative and Budgetary Questions for 1977.

<sup>2</sup> As indicated in par 51 of the report, these estimates, unlike the previous ones, are based on "full costing." At this stage, no appropriation is being requested for this purpose under sec. 22 and 23.  
<sup>3</sup> See under "Seminars," annex IV, in previous estimates, a provision for "traveling seminars" had been included under consultants for regional commissions.

## ANNEX I

## OBJECTIVES AND AGENDA

*Objectives*

As recommended by the Economic and Social Council in resolution 2028 (LXI), paragraph 2, the "main objectives of the Conference should be:

"To adopt concrete decisions on ways and means of applying science and technology in establishing a new international economic order, as a strategy aimed at economic and social development within a time frame;

"To strengthen the technological capacity of developing countries so as to enable them to apply science and technology to their own development;

"To adopt effective means for the utilization of scientific and technological potentials in the solution of problems of development of national, regional and global significance, especially for the benefit of developing countries;

"To provide instruments of co-operation to developing countries in the utilization of science and technology for solving socio-economic problems that cannot be solved by individual action, in accordance with national priorities."

It was stressed that the Conference should be oriented towards practical action and be attended by national policy and decision-makers accompanied by their scientific advisers.<sup>1</sup>

*Agenda*

The Council, in resolution 2028 (LXI), recommended the following agenda for the Conference:

## 1. Science and technology for development:

(a) The choice and transfer of technology for development;

(b) Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries;

(c) Methods of integrating science and technology in economic and social development;

(d) New science and technology for overcoming obstacles to development.

## 2. Institutional arrangements and new forms of international co-operation in the application of science and technology;

(a) The building up and expansion of institutional systems in developing countries for science and technology;

(b) Research and development in the industrialized countries in regard to problems of importance to developing countries;

(c) Mechanisms for the exchange of scientific and technological information and experiences significant to development;

(d) The strengthening of international co-operation among all countries and the design of concrete new forms of international co-operation in the fields of science and technology for development;

(e) The promotion of co-operation among developing countries and the role of developed countries in such co-operation.

## 3. Utilization of the existing United Nations system and other international organizations;

Utilization of the existing United Nations system and other international organizations to implement the objectives set out above in a co-ordinated and integrated manner.

## 4. Science and technology and the future:

Debate on the basis of the report of a panel of experts to be convened on this subject.

## ANNEX II

DECISIONS ADOPTED BY THE PREPARATORY COMMITTEE AT ITS FIRST SESSION<sup>2</sup>1. (I). *Programme of work for the preparatory period for the United Nations Conference on Science and Technology for Development*

The Preparatory Committee for the United Nations Conference on Science and Technology for Development decides to adopt the following programme of work for the preparatory period for the Conference:

<sup>1</sup> Official Records of the Economic and Social Council, Sixty-first Session, Supplement No. 3 (E/5777), para. 21.

<sup>2</sup> Adopted by the Preparatory Committee on 11 February 1977 at its 10th meeting (84th meeting of the Committee on Science and Technology for Development).

#### *A. National papers*

1. Each State is requested to prepare a single national paper in accordance with the guidelines approved by the Committee at its first session. The national paper will include an identification of goals, policies, priorities and recommendations dealing with the application of science and technology to development at the national, regional and global levels in accordance with the agenda of the Conference.

2. National papers should be completed and submitted to the Conference secretariat by 1 May 1978.

3. The Conference secretariat, in co-operation with the organs and agencies of the United Nations system, should, at the request of Governments, provide assistance for the preparation of national papers.

4. Such assistance should be available during the period April 1977 to April 1978.

#### *B. Regional meetings and papers*

5. In the course of 1977, the Conference secretariat, in co-operation with the United Nations regional commissions and other concerned organizations of the United Nations system, should assist countries in their respective regions with the preparation of national papers. Each regional commission will convene a meeting with the participation of the Secretary-General of the Conference and other concerned organizations of the United Nations system in the second half of 1977 to assess the progress and, on the basis of suggestions received from the countries in their respective regions, make recommendations on a maximum of five subject areas for consideration by the Preparatory Committee for the Conference at its second session 23-27 January 1978.

6. Each United Nations regional commission will convene a meeting with the participation of the Secretary-General of the Conference and concerned organizations of the United Nations system in June/July 1978 to review national papers in order to prepare regional papers which will deal with policies and plans of action related to problems at the regional level in accordance with the agenda of the Conference, bearing in mind, wherever appropriate, subject areas. The regional papers will be submitted to the Preparatory Committee at its third session in September 1978.

7. Should Governments of a region decide, on their own account, to convene also regional and subregional meetings in other forums for consideration of the issues mentioned in paragraphs 5 and 6 above, the results of these meetings should be regarded as inputs at the appropriate stages in the preparatory process for the Conference.

#### *C. Input from the United Nations system*

8. The Secretary-General of the Conference is requested to submit, in co-operation with the organs, organizations and programmes of the United Nations system, a paper with an over-all view describing the manner in which their respective programmes have linked science and technology to socio-economic development and international co-operation related to the agenda of the Conference. These papers should be completed by 1 May 1978 and submitted to the Preparatory Committee at its third session.

9. The Secretary-General of the Conference is requested to prepare, in co-operation with the units of the United Nations system that are responsible for implementing the decisions of recent United Nations conferences, a review of the progress in the implementation of the recommendations of such conferences highlighting the role of science and technology for development.

#### *D. Interregional meetings*

10. The developing countries may meet on an interregional level during the later stages of the preparatory process. The Secretary-General of the Conference and his staff should participate in such a meeting for which, however, no financial provision is made at the present stage.

#### *E. Intergovernmental organizations and non-governmental organizations*

11. Intergovernmental organizations and non-governmental organizations are invited to contribute papers on the application of science and technology to development in accordance with paragraph 10 of Economic and Social Council resolution 2028 (LXI) of 4 August 1976.

### Documentation

12. Documentation for the Conference should comprise national papers, regional papers, background papers from the United Nations system and from intergovernmental and non-governmental organizations, and documents to be prepared by the Conference secretariat on each of the items of the agenda for the Conference, including a plan of action.

13. The Secretary-General of the Conference is requested to submit a draft plan of action to the Preparatory Committee in February 1979.

### G. Chronology of preparatory activities for the Conference

14. The chronology of preparatory activities for the Conference shall be as follows:

#### Date and activities

February 1977–April 1978: Preparation of national papers. Effective co-operation from the Conference secretariat, in co-operation with United Nations organs and agencies, will begin as of April 1977.

July–December 1977: Meetings of the regional commissions.

23–27 January 1978: Second session of the Preparatory Committee.

1 May 1978: Deadline for the submission of national papers to the Conference secretariat.

19 June–28 July 1978: Regional meetings.

31 July–11 August 1978: Advisory Committee on the Application of Science and Technology to Development meetings.

September 1978 (a duration of two weeks): Third session of the Preparatory Committee for the United Nations Conference on Science and Technology for Development.

September 1978 to 31 January 1979: Preparation by the Conference secretariat of the first draft Conference documents to be submitted to the Preparatory Committee for the United Nations Conference on Science and Technology at its fourth session.

February 1979 (a duration of two weeks): Fourth session of the Preparatory Committee for the United Nations Conference on Science and Technology<sup>2</sup>.

15 February–30 June 1979: Preparation and reproduction of final Conference documents to be made available to participants of the Conference.

August/September 1979: Convening of the Conference.

### ANNEX III

#### DELINEATION OF RESPONSIBILITIES IN ACCORDANCE WITH ECONOMIC AND SOCIAL COUNCIL RESOLUTION 2123 (LXIII) (PARA. 6)

Economic and Social Council resolution 2123 (LXIII) calls upon the Secretary-General to delineate, *inter alia*, the specific responsibilities of the Office for Science and Technology as well as the responsibilities of the additional personnel seconded from the United Nations Conference on Trade and Development, the United Nations Industrial Development Organization, the United Nations Educational, Scientific and Cultural Organization, the World Intellectual Property Organization and all other bodies and organizations of the United Nations system.

#### I. Office of Science and Technology

As already set forth in the note of the Secretary-General to the Advisory Committee on Administrative and Budgetary Questions (ACABQ) dated 29 April 1977 (A/CN.1/R.858) and in the report of the Secretary-General on the implementation of General Assembly resolution 31/184 submitted through the Economic and Social Council on 15 June 1977 (E/6000), functional links have been established between the Conference secretariat and the Department of Economic and Social Affairs in the light of the provisions of paragraph 5 of Economic and Social Council resolution 2028 (LXI), paragraph 10 of General Assembly resolution 31/184, and paragraph 2(a) of resolution 1 (I) of the Preparatory Committee. These arrangements guarantee over-all support by the Department of Economic and Social Affairs and its relevant subsidiary units, in particular the Office for Science and Technology, and provide for specific contributions by it to the work of the Conference.

<sup>2</sup> Third special session of the Committee on Science and Technology for Development.



In consultation with the secretariat of the Conference, the Office for Science and Technology, in its role as secretariat of the Committee on Science and Technology for Development (though not when that body is acting as Preparatory Committee for the Conference), of the Advisory Committee on the Application of Science and Technology to Development (ACAST), and of the Sub-Committee on Science and Technology of the Administrative Committee on Co-ordination (ACC), is responsible for ensuring the required co-ordination between the work of those bodies and other activities carried out in connection with the Conference.

Furthermore, while continuing to meet its day-to-day responsibilities that are unrelated to the Conference, the Office for Science and Technology (OST) will endeavour to co-ordinate, to the fullest extent possible, contributions of the Department of Economic and Social Affairs to the preparatory work for the Conference.

In this connexion, in addition to the activities performed by the Office for Science and Technology on a continuing basis, as set forth in the medium-term plans for 1976-1979 and 1978-1981 and also in the programme budget for the biennium 1978-1979, it should be noted that the programme of the Office for Science and Technology is explicitly directed towards preparation for the United Nations Conference on Science and Technology for Development (A/32/6, vol. I, pp. 289-241).

Attention is drawn in particular to two out of the six subprogrammes of OST in the programme budget for the biennium 1978-1979 in view of their relevance to the Conference agenda:

*Subprogramme 1.*—Preparation of supplements to the World Plan of Action on topics to be determined by ACAST and the revision of regional plans of action with the participation and assistance of regional commissions;

*Subprogramme 2.*—Co-ordination of scientific and technological programmes of the United Nations system comprising (a) selective surveys of activities and dissemination of the results to Member States, and (b) efforts towards a gradual integration of relevant plans and programmes into a science and technology policy for the system as a whole.

With regard to the preparation of supplements to the World Plan of Action, it is envisaged that these will constitute background documents for the Conference and provide alternatives for consideration by Governments in their preparation of analyses of socio-economic problems which may be solved with the help of science and technology. (Economic and Social Council resolution 2028 (LXI), para. 3 II 1.) When a decision is made by the Preparatory Committee on the five subject areas, new or revised chapters of the World Plan might then be prepared. These chapters would review existing work within and outside the United Nations system in the five subject areas from an interdisciplinary and interagency perspective.

The introduction to the World Plan would be brought up to date taking into account (a) the decisions made at the sixth and seventh special sessions of the General Assembly relating to the establishment of a new international economic order, and (b) recent developments concerning the specific goals for science and technology in relation to the Second United Nations Development Decade which have been proposed by ACAST.

The work to be carried out concerning a science and technology policy for the United Nations system will provide a useful contribution to the preparation of the Conference document dealing with agenda item 3. The report on this subject by ACAST would not only help in identifying the issues to be taken up by the Conference under this agenda item but would also be of use to Governments in the preparation of their national papers.

In addition to these important functions, it is proposed that OST, with the involvement of ACAST members, should assume major responsibility for relations with those non-governmental organizations which may be in a position to contribute constructively to the preparations for the Conference (see para. 13 of General Assembly resolution 31/184). The nature of these activities and the role of ACAST members in this respect should be examined and defined at the twenty-third session of ACAST. These activities would, of course, be subject to review by the Secretary-General of the Conference so as to allow for *ad hoc* arrangements as required. Further, these functions would be carried out with due regard for the particular interests of the specialized agencies and other concerned organizations of the United Nations system.

The specific functions of OST with respect to the Conference will of necessity evolve further as a result of decisions made by the Preparatory Committee for the period leading up to the Conference.

Undoubtedly, these additional responsibilities, plus the servicing of more frequent meetings of the Committee on Science and Technology for Development, ACAST and the ACC Sub-Committee, will result in an increased workload for OST. However, it is expected that this can be accommodated within the manpower resources allocated to OST in the programme budget for the biennium 1978-1979.

## II. Personnel seconded from organizations of the United Nations system

Resolution 2028 (LXI) of the Economic and Social Council, endorsed by resolution 31/184 of the General Assembly, specifies in paragraph 5 that the secretariat of the Conference should include "competent personnel from UNCTAD, UNIDO, UNESCO and other bodies and organizations of the United Nations system".

According to the same resolution "competent bodies and organizations of the United Nations system should, for the purpose of the Conference, be prepared to depute high-level specialists to the secretariat of the Conference in order to give substantive support to the Secretary-General of the Conference in the preparatory work for the Conference, and to constitute links between those bodies and organizations and the Secretariat-General of the Conference".

In consequence, such personnel will:

- Be of a high calibre;
- Have responsibilities of a substantive nature and a specialized character;
- Provide a conceptual link between the secretariat of the Conference and the organizations which make them available.

Clearly, this last function is not considered as an administrative one, since it will be the responsibility of these officers to reflect the current thinking of their organizations in the preparation of material for consideration by the Conference. Administrative co-ordination will remain the exclusive function of the Administrative Committee on Co-ordination and its Sub-Committee on Science and Technology.

In their substantive work in the secretariat, these personnel will, of course, in principle, be assigned tasks relating specifically to the particular area of experience and competence of their respective organizations.

## ANNEX IV

### STAFFING AND OTHER FINANCIAL REQUIREMENTS FOR THE BIENNIUM 1978-1979

	Authorized for 1977					New posts requested for 1978-79
	Originally envisaged in A/C.5/31/89	By General Assembly at its 31st sess.	By ACABQ under resolution 3540 (XXX)	Total	Total requested for 1978-79	
<b>Professional category and above:</b>						
Secretary-General of the Conference (USG).....	1	1		1	1	
Deputy Secretary-General (D-2).....	1			1	1	1
Principal Officer (D-1) <sup>1</sup> .....	1	1	2	3	3	
Senior Officer (P-5).....	5		2	2	5	3
First Officer (P-4).....	2		1	1	3	2
Second Officer (P-3).....	1					
Associate Officer (P-2).....					1	1
<b>Subtotal.....</b>	<b>11</b>	<b>2</b>	<b>5</b>	<b>7</b>	<b>14</b>	<b>7</b>
<b>General service category.</b>						
G-5.....	2	2		2	2	
G-4/1.....	5		2	2	7	5
<b>Subtotal.....</b>	<b>7</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>9</b>	<b>5</b>
<b>Grand total.....</b>	<b>18</b>	<b>4</b>	<b>7</b>	<b>11</b>	<b>23</b>	<b>12</b>

<sup>1</sup> D-1 provided by the Office for Science and Technology, Department of Economic and Social Affairs

## A. CONFERENCE SECRETARIAT (\$1,789,400)

Level	Functions	Salary	Common staff costs	Total costs
<b>(1) TEMPORARY ASSISTANCE REQUIREMENTS</b>				
USG	Secretary General of the Conference <sup>1</sup>	\$113,300	<sup>2</sup> \$44,300	\$157,600
D-2	Deputy Secretary-General of the Conference	89,800	<sup>2</sup> 29,600	119,400
D-1	Executive Secretary <sup>1</sup>	81,400	26,000	107,400
D-1	Principal Scientific Coordinator <sup>1</sup>	81,400	26,000	107,400
D-1	Principal Liaison Officer <sup>1,4</sup>			
P-5	Special Assistant to Secretary-General of the Conference <sup>1</sup>	74,500	23,800	98,300
P-5	Responsible for the preparations for agenda item 1	74,500	23,800	98,300
P-5	Responsible for the preparations for agenda item 2	74,500	23,800	98,300
P-5	Responsible for the preparations for agenda item 3	74,500	23,800	98,300
P-5	Responsible for the preparations for agenda item 4 <sup>1</sup>	74,500	23,800	98,300
P-4	Scientific Coordinator	62,500	20,000	82,500
P-4	Scientific Editor	62,500	20,000	82,500
P-4	Administrative Officer <sup>1</sup>	62,500	20,000	82,500
P-2	Documents and Associate Administrative Officer	41,100	13,200	54,300
	<b>Total</b>	<b>966,000</b>	<b>318,100</b>	<b>1,284,100</b>
G-5	Assistant to the Secretary-General of the Conference <sup>1</sup>	32,400	10,400	42,800
G-5	Administrative/Financial Clerk <sup>1</sup>	32,400	10,400	42,800
7 G-4	Secretarial assistance <sup>5</sup>	165,100	52,800	217,900
	<b>Total</b>	<b>229,900</b>	<b>73,600</b>	<b>303,500</b>
	<b>Grand total</b>	<b>1,195,900</b>	<b>391,700</b>	<b>1,587,600</b>
<b>(2) RELATED COSTS</b>				
	Furniture			\$1,900
	Office equipment			15,400
	Accommodations			131,200
	Communications			31,000
	Office supplies			7,300
	Hospitality			5,000
	<b>Total</b>			<b>201,800</b>

<sup>1</sup> Post approved for 1977.<sup>2</sup> Includes representation allowance of \$18,000.<sup>3</sup> Includes representation allowance of \$1,200.<sup>4</sup> Provided by Office for Science and Technology at no additional cost.<sup>5</sup> 2 of which approved for 1977.

## B. REGIONAL COMMISSIONS: TEMPORARY ASSISTANCE (\$409,500)

## (1) STAFFING REQUIREMENTS FOR 1978-79

Category	Functions	Number of staff					Work-months
		ESCAP	ECLA	ECA	ECWA	Total	
L-6	Regional advisers	1	1	1	1	4	136
P-1	Strengthening of science and technology units of regional commissions to allow effective participation in conference preparations	1	1	1	1	4	48
Local level	Secretarial services	1	1	1	1	4	48

<sup>1</sup> ESCAP, 12 work-months; ECLA, 6 work-months; ECA, 12 work-months; ECWA, 6 work-months.

## (2) RELATED TEMPORARY ASSISTANCE COSTS (PROFESSIONAL AND LOCAL LEVEL STAFF AND REGIONAL ADVISERS)

	Salary	Common staff costs	Total costs
Economic and Social Commission for Asia and the Pacific	\$63,400	\$28,000	\$91,400
Economic Commission for Latin America	54,000	21,600	75,600
Economic Commission for Africa	78,100	21,200	99,300
Economic Commission for Western Asia	61,100	18,400	79,500
<b>Total</b>	<b>256,600</b>	<b>97,200</b>	<b>353,800</b>

## (3) TRAVEL AND SUBSISTENCE OF PROFESSIONAL STAFF AND REGIONAL ADVISERS

	Amount
ECF.....	\$7,700
ESCAP.....	16,300
ECLA.....	7,700
ECA.....	16,300
ECWA.....	7,700
Total.....	55,700

## C. TECHNICAL ADVISERS

An appropriation of \$660,000 is requested to provide 100 work-months of technical adviser services as follows:

	Per month
Technical adviser (L-5).....	\$4,400
Average cost of air fare.....	700
Subsistence.....	1,500
Total.....	16,600

<sup>1</sup> Times 100 work months equals \$660,000.

## D. Travel and subsistence

## (1) Headquarters staff

An appropriation of \$105,000 is requested to cover the following requirements:

(a) Travel in connection with the regional meetings.....	\$20,800
(b) Travel by the Secretary-General of the Conference for consultations with government officials and attendance at intergovernmental meetings.....	25,700
(c) Travel of staff to attend specialized meetings and conferences and to assist in the preparatory process.....	41,500
(d) Participation at the Conference on Technical Co-operation among Developing Countries.....	8,000
	105,000

## (2) Travel of experts for meetings on science and technology and the future

First class transportation and subsistence at 40 per cent over the standard rate is proposed for the high-level experts participating in the meetings in 1978 and 1979. It is expected that 12 experts will participate in these meetings which are scheduled to last five days each in New York. The related costs are estimated at \$29,000 for 1978 and \$30,400 for 1979, for a total of \$59,400 for the biennium.

## (3) Travel of experts from least-developed countries to attend Conference

In accordance with paragraphs 7 and 9 of Economic and Social Council resolution 2035 (LXI), the United Nations would provide, as a contribution toward adequate representation from the least developed among the developing countries, for the cost of attendance at the Conference of no more than 12 experts and members of relevant specialized bodies. Based on an average economy air fare of \$1,550 and subsistence at standard rates (\$770 per expert) the related costs in 1979 are estimated at \$27,800.

## (4) Travel of representatives of national liberation movements

It is anticipated that five representatives would attend the Conference. Based on an average economy air fare of \$1,550 and subsistence at standard rates (\$770 per representative), the related costs in 1979 are estimated at \$11,000.

## E. Consultants and contractors (\$80,800)

## (1) Headquarters (\$200,000)

In connection with activities listed in paragraph 39 of this report, the consultants would be needed for a period of two months each, at a fee of \$3,200 per month plus travel and subsistence at an estimated cost of \$1,800 per work-month. Total costs are estimated at \$50,000 as follows:

Fee (10 work-months x \$3,200 per month) .....	\$32,000
Travel and subsistence .....	18,000
	<u>50,000</u>

Requirements with regard to preparation of the documentation indicated in paragraph 39(b) of this report are estimated at \$40,000 as follows:

Fee (8 work-month x \$3,200 per month) .....	\$25,600
Travel and subsistence .....	14,400
	<u>40,000</u>

In addition, provision of \$200,000 is requested for the preparation of the documentation for the five conferences subject areas, as indicated in paragraph 39(c) of this report.

(2) *Regional commissions (\$90,800)*

At an estimated cost of \$3,200 per work month, the requirements for consultants for the regional commissions is estimated at \$90,800 as follows:

	Consultants fee	Travel and subsistence	Total
ECE (4 work-months) .....	\$12,800	\$3,000	\$15,800
ESCAP .....	12,800	6,600	19,400
ECLA .....	12,800	5,300	18,100
ECA .....	12,800	6,600	19,400
ECWA .....	12,800	5,300	18,100
Total .....	64,000	26,800	90,800

*F. Seminars (\$241,600)*

The following assumptions are made in estimating the cost of the holding of these seminars:

(a) That the average duration of the seminars would be one week;

(b) That travel and subsistence would need to be provided for the attendance of two staff members from the Conference secretariat and one staff member from the regional commissions;

(c) That the regional, subregional and topical seminars would be attended by up to five experts from the regions;

(d) That no provision will need to be made for interpretation or translation services.

The number of anticipated seminars is as follows:

	Regional and subregional seminars	Topical seminars	Other seminars
ESCAP .....	2	2	4
ECLA .....	2	2	4
ECA .....	4	2	6
ECWA .....	1	1	2
Total .....	9	7	16

The related costs are estimated at \$241,600 as follows:

	Amount
Regional and subregional seminars: 9 at an estimated cost of \$10,300 each .....	\$92,700
Topical seminars: 7 at an estimated cost of \$10,300 each .....	72,100
Other seminars: 16 at an estimated cost of \$4,800 each .....	76,800
Total .....	<u>241,600</u>

## G. INFORMATION ACTIVITIES (\$296,400)

Item	1978	1979	Total
<b>A. Publication:</b>			
1. Who, what, where, when, how brochure, 4 to 6 pages 80,000 copies in E/F/S and Arabic (cost of printing only (translation in-house))	\$4,000		\$4,000
2. Preconference explanatory booklet, 60 to 80 pages 15,000 copies in E/F/S and Arabic Cost of translation into 3 languages, \$3,800; cost of printing in 4 languages \$13,500		\$17,300	17,300
Subtotal	4,000	17,300	21,300
<b>B. Journalists encounter: 25 journalists (including 20 who participated in regional study tours)—travel, \$40,000, subsistence and terminal, \$20,000, travel of staff, \$8,000, documentation, local costs, \$7,000, postencounter evaluation and report, \$10,000.</b>		85,000	85,000
<b>C. Regional activities</b>			
1. Booklets on regional activities leading to the conference 5 regions, 8,000 copies in 2 languages in each region Translation in-house, Printing costs only in each region, \$6,000	30,000		30,000
2. Journalists study tours. Africa, 7 journalists to Europe, \$10,500, Asia, 6 journalists to Japan, \$7,800; Latin America, 5 journalists to Brazil, \$5,500, Middle East, 2 journalists to Europe, \$2,200, consultants, staff travel (each region, \$2,500—\$2,500 × 4 = \$10,000)		35,000	35,000
Subtotal	30,000	35,000	65,000
<b>D. NGO forum: Documentation, \$6,000; travel of organizers for contacts with NGO's, \$4,500</b>		10,500	10,500
<b>E. Personnel component:</b>			
Information officer (P-4)	23,000	31,900	54,900
Common staff costs	7,400	10,200	17,600
Secretary (G-4)	8,600	12,200	20,800
Common staff costs	2,800	3,900	6,700
Related costs	7,300	6,300	13,600
Subtotal	49,100	64,500	113,600
<b>Grand total</b>	<b>83,100</b>	<b>213,300</b>	<b>296,400</b>

*H Conference servicing costs (\$1,214,500)*

Conference servicing costs, for which, subject to the reservation made in paragraph 51 of the present report, no provision is requested at this time, are estimated at \$1,214,500 as follows.

*Regional meetings**Assumptions*

Number of meetings: Five.

Date: June 1978.

Duration: 5 working days.

Location: Headquarters of the regional commissions—one meeting in the morning, one in the afternoon.

Languages: English, French and the language of the Commission.

Documentation: Pre-session, 120 pages (plus reproduction of 900 pages of national papers expected to be submitted in one of the three languages of the meeting), in-session, 50 pages; post-session, 20 pages.

*Costs*

Interpretation	\$92,500
Translation and revision	122,900
Typing	48,500
Other conference servicing staff	2,500
Reproduction and distribution	145,600
<b>Total</b>	<b>412,000</b>

*Expert group meetings**Assumptions*

Two expert group meetings on Science and Technology and the Future, the first in September 1978; the second in 1979.

Location: New York.

Duration of each meeting: 5 working days (each meeting)—one meeting in the morning, one in the afternoon.

Languages: English, French and Spanish.

Documentation: Pre-session, 20 pages; in-session, 10 pages; post-session documentation will be part of the pre-session documentation of the Preparatory Committee.

#### *Costs*

Interpretation .....	\$42,200
Translation and revision .....	11,800
Typing .....	8,100
Conference servicing staff .....	900
Reproduction and distribution .....	2,800
<b>Total .....</b>	<b>65,800</b>

#### *Preparatory Committee*

#### *Assumptions*

Two meetings, the first in September 1978 and the second in February 1979.

Location: New York.

Duration of each meeting: 10 working days—one meeting in the morning, one in the afternoon.

Languages: English, French, Russian and Spanish.

Documentation: In September 1978: pre-session, 60 pages; in-session, 80 pages; Post-session, 30 pages; in February 1979: pre-session, 125 pages; in-session, 80 pages; post-session, 30 pages.

#### *Costs*

Interpretation .....	\$85,500
Translation and revision .....	80,500
Typing .....	27,100
Other conference servicing staff .....	1,700
Reproduction and distribution .....	20,000
<b>Total .....</b>	<b>214,800</b>

#### *The Conference*

#### *Assumptions*

Date: September 1979.

Location: New York.

Duration of each meeting: 10 working days, 3 meetings in the morning, 3 in the afternoon.

Languages: Chinese, English, French, Russian and Spanish.

Documentation: Pre-session, 500 pages; in-session, 200 pages; post-session, 200 pages.

#### *Costs*

Interpretation .....	\$175,500
Translation and revision .....	221,400
Typing .....	71,800
Other conference servicing staff .....	2,400
Reproduction and distribution .....	48,900
<b>Total .....</b>	<b>521,000</b>

#### *Summary of costs*

Regional meetings .....	\$412,000
Expert group meetings .....	65,800
Preparatory Committee .....	214,800
The Conference .....	521,000

**Total 1978-79 conference servicing costs .....** 1,214,500

#### *I. Common services for meetings (\$85,810)*

The Office of General Services has indicated that, on a full-costing basis at this stage, the following costs would be incurred for the holding of the various meetings:

	Sound recordings	Security	General operating expenses	Total
Regional meetings: 1978.....	\$7,350	\$12,600	\$5,250	\$25,200
Expert group meetings on science and technology and the future.....				
1978.....	1,470	2,250	1,050	5,040
1979.....	1,540	2,650	1,100	5,290
Preparatory committees:				
1978.....	2,940	5,040	2,100	10,080
1979.....	3,100	5,300	2,200	10,600
Conference.....	3,100	24,300	2,200	29,600
Total.....	19,500	52,410	13,900	85,810

UNITED NATIONS GENERAL ASSEMBLY,  
December 7, 1977.

Thirty-second session, Second Committee, Agenda item 62.

UNITED NATIONS ENVIRONMENT PROGRAMME

*Living conditions of the Palestinian people*

*Administrative and financial implications of the draft resolution contained in  
document A/C.2/32/L.51*

*Statement submitted by the Secretary-General in accordance with rule 153 of  
the rules of procedure*

1. In paragraph 2 of the draft resolution contained in document A/C.2/32/L.51, the Secretary-General, in collaboration with the relevant United Nations organs and specialized agencies, particularly the United Nations Relief and Works Agency for Palestine Refugees and the Economic Commission for Western Asia, would be requested to prepare and submit to the General Assembly at its thirty-third session a comprehensive and analytical report on the social and economic impact of the Israeli occupation on the living conditions of the Palestinian people in the occupied territories.

2. The report requested in the draft resolution would require a more intensive deployment of expertise than the report on the living conditions of the Palestinian people in the occupied territories (A/32/228) which was submitted to the General Assembly as requested in its resolution 31/110 and which the present draft resolution, in program 1, would have the Assembly consider as not meeting adequately the objectives of resolution 31/110.

3. Moreover, the report would have to be prepared under extremely difficult constraints of time and place. These constraints would not permit the undertaking of time-consuming intensive basic research and surveys. The report would be based necessarily on the material available within the United Nations system and on information to the extent that it is obtainable in the respective countries. All Governments concerned would be requested to make available whatever information they have and to co-operate in providing and obtaining other information as needed. Available written material would have to be supplemented through personal interviews and other direct inquiries which will necessitate considerable field work.

4. If permission to visit the occupied territories is not granted, the inquiry would not be able to provide a first-hand account of the social and economic impact. The report would interpret the impact only in a general sense and based on several indicators that would have to be established on the basis of material that could be obtained in other countries concerned.

5. In view of the very broad scope of the report now being requested, and in order to ensure a balanced expert view, a team of three consultants, comprising a physical planner, an economist and a sociologist, would be required to properly discharge the task. Since the team of consultants would need to interview the local population as well as discuss the relevant issues with key community leaders and government officials, proper communication in the Arabic language



must be assured. As it may not be possible to find experts with sufficient knowledge of Arabic, provision is to be made for interpreters and translators.

6. It is envisaged that the task would take a total of 14 work months of consultant services. For the purpose of collecting data, including the interview of witnesses, one of the consultants, the team leader, would make two trips from Headquarters in New York to the countries concerned in the Middle East while the two other consultants would make one trip. They would be assisted during the trips in the countries concerned by an officer from the United Nations Relief and Works Agency for Palestine Refugees or the Economic Commission for Western Asia, as well as by three interpreters since each consultant may have to concentrate on different aspects of the inquiry.

7. The related costs are summarized as follows:

	Amount
Consultants:	
14 work months.....	\$41, 100
Travel and subsistence.....	17, 300
Subtotal.....	61, 400
UNRWA/ECWA officer: Travel and subsistence.....	4, 600
Interpreters:	
Salary.....	22, 100
Travel and subsistence.....	12, 800
Subtotal.....	34, 900
Contractual translation to English of collected basic material 400 pages from Arabic and 100 pages from Hebrew.....	10, 000
Total.....	110, 900

8. In summary, should the General Assembly adopt the draft resolution in document A/C.2/32/L.51, total additional appropriations in the amount of \$110,900 would be required under the human settlements programme in section 5A of the proposed programme budget for 1978-1979.

9. In addition, provision in the amount of \$48,600 would have to be made under section 23 for the processing of the experts' report (50 pages) in six languages, as follows:

Processing of report:	
Translation.....	\$0, 000
Revision.....	4, 800
Typing.....	3, 700
Reproduction and distribution.....	3, 200
Travel of non-local recruits.....	27, 000
Total.....	48, 600

10. The conference servicing requirements indicated above have been estimated on a "full costing" basis, in the sense that all incremental costs have been estimated as "non-absorbable". To the extent that any additional appropriations might be required, this will be reflected in the consolidated report to be submitted at the end of the current session of the General Assembly when the pattern of conferences for 1978 is under consideration.

ORGANIZATION OF AMERICAN STATES,  
Washington, D.C., December 14, 1977.

Hon. ADLAI E. STEVENSON,  
Chairman, Subcommittee on Science, Technology and Space, U.S. Senate, Washington, D.C.

DEAR SENATOR STEVENSON: This letter is in confirmation of our conversations with members of your staff in response to your letter of November 23rd, 1977 concerning hearings to be conducted by your Subcommittee on Science, Technology and Space in preparation for the 1979 United Nations Conference on Science and Technology for Development.

I wanted you to know, Senator Stevenson, that we greatly appreciated your kind invitation to use to provide testimony before your Subcommittee in an area of great interest to the Organization of American States. Through its Regional Scientific and Technological Development Program, the OAS has been engaged for more than a decade in efforts to help the Latin American countries to develop their capabilities in science and technology and in promoting cooperation among themselves. You will recall that many of these efforts had their origin and impetus in the historical meeting of American Chiefs of State in 1967 at Punta del Este, Uruguay, attended by President Lyndon B. Johnson, which resulted in a declaration expressing the intention of harnessing science and technology for the service of the Latin American people.

While it will not be possible for us to provide testimony personally, given the international character of our positions, I did want you to know that we shall provide the United States Mission to the OAS background material and references which we feel will be of value to the Subcommittee as the Subcommittee conducts its deliberations in this important area of science and technology for development.

We shall follow these hearings with great interest.

With every good wish,

Sincerely,

ALEJANDRO ORFILA,  
*Secretary General.*

U.S. PERMANENT MISSION TO THE ORGANIZATION OF AMERICAN STATES,  
DEPARTMENT OF STATE,  
Washington, D.C., December 14, 1977.

HON ARLAN B. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, U.S. Senate, Washington, D.C.*

DEAR ARLAN: In connection with the forthcoming hearings of your Subcommittee on Science, Technology and Space in preparation for the 1979 United Nations Conference on Science and Technology for Development and in response to questions raised in your recent communication to OAS Secretary General Alejandro Orfila, I thought you would like to have the enclosed, very brief summary of the nature and scope of the activities of the Organization of American States in this particular field.

As the preparations for the United Nations Conference on Science and Technology go forward, the Secretariat of the OAS has been in close contact with the Secretariat of this United Nations Conference. For example, Ambassador Frank Da Costa, Secretary General of the Conference, paid a visit to the OAS Department of Scientific Affairs in August of this year; and it was agreed that the OAS would participate in all United Nations regional meetings preparatory to the Conference. At the recent United Nations regional meeting in Mexico the OAS was represented.

Arrangements also have been made so that any OAS member state can request OAS assistance in preparing its national monographs for the United Nations Conference. At recent meetings of the Central American Commission for Science and Technology Policy and Planning and the Caribbean Science and Technology Coordinating Committee, under the auspices of the OAS, attention was called to the forthcoming United Nations Conference in order to permit an exchange of views, a practice that will be continued at future OAS meetings.

Sincerely,

GALE MCGEE, *Ambassador.*

#### SCIENCE AND TECHNOLOGY PROGRAM OF THE ORGANIZATION OF AMERICAN STATES

For the past ten years, the OAS has had a Regional Program for the Development of Science and Technology in Latin America which is unique among international organizations. The guiding principles of this OAS program are self-help and "horizontal" transfer of science and technology among the Latin American countries.

The principal aim of the OAS Regional Program is multinational cooperation in science and technology and the building of national capabilities, both in terms of human resources and scientific infrastructure. Every multinational project, whether in physics, food technology, or technical information

for industry, involves periodic meetings of all the project directors of the different countries to share research results and plan cooperative actions. In addition, regional seminars, courses, and conferences on topics of common interest are held for each program area.

The OAS Regional Program also includes a number of Special Projects, emphasizing multinational cooperation in the application of science and technology to concrete developmental problems. Examples of these projects are Solar Energy Utilization (Argentina, Bolivia, Brazil, Jamaica, Mexico, Trinidad and Tobago), Low Cost Housing (Argentina, Bolivia, Brazil, Chile, Ecuador, El Salvador, Mexico, Nicaragua), Utilization of Sugar Cane Byproducts (Barbados, Dominican Republic, Haiti, Jamaica, Mexico, Trinidad and Tobago, Guatemala), and Development of Arid and Semiarid Zones (Argentina, Chile, Haiti, Mexico, Peru).

A special feature of the OAS Program is the process by which each country decides for itself which projects in Science and Technology best serve the national interest. Each government designates an agency the national liaison office, frequently a unit of the Ministry of Planning, to present a coherent program to the OAS. In order to assist with the planning process, the OAS Regional Program offers a multinational Program of Science and Technology Policy and Planning in which the agencies of the participating countries jointly meet, commission studies, and cooperate in the preparation of science and technology programs. In some cases OAS member states have formed special bodies under OAS sponsorship to institutionalize this collaboration in programming. Two examples are the Central American Commission for Science and Technology Policy and Planning and the Caribbean Science and Technology Coordinating Committee. The very process of preparing the science program is one of its most interesting and beneficial aspects.

An example of the role of the OAS in the "horizontal" transfer of technology—the exchange of information among nations of the Region—was a meeting held last week in Washington of the directors of the major technological and industrial research institutes of Latin America and the Caribbean. This was the first time they had ever met as a group and, manifesting the strong common interest they discovered, approved a series of suggestions and resolutions for common action including directions for the OAS Secretariat to create programs which would strengthen the linkages among them.

I hope the foregoing outline of the nature and extent of the work of the Organization of American States in this important field of science and technology will be of interest and reference value to the Subcommittee. The U.S. Mission to the OAS stands ready to supplement the foregoing outline with more detailed background and explanation.

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THE ROCKEFELLER UNIVERSITY,  
New York, N.Y., January 3, 1978.

HON. ADLAI B. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, Senate Committee on Commerce, Science, and Transportation, Dirksen Office Building, Washington, D.C.*

DEAR SENATOR STEVENSON: I am writing formally in response to your and Senator Schmitt's invitations to submit further material for the record of the hearings conducted by your Subcommittee on December 15 regarding preparations by the United States for the United Nations Conference on Science and Technology for Development.

To begin with, Frederick Seitz and I would like to thank you again for the opportunity to present testimony at the hearings. As we said in our formal testimony, we applaud your initiative in arranging these hearings and we hope very much that you will sustain your constructive interest in this extremely important set of issues. The Conference itself is certainly not as important as the opportunity it provides to think through the ways in which science and technology relate to American foreign policy with respect to the developing countries.

In terms of these larger issues, I am glad to report that we have received the approval of Frank Press, Director of the Office of Science and Technology Policy, to release the enclosed letter that was prepared on comparatively short notice to outline the possible U.S. strategy, objectives, and tactics for the UN Conference. You are free to include this letter in the formal record of the hearings. In fact,

we hope you will do so in order to stimulate further debate on the ways in which the U.S. might participate most constructively, in our national interests, within the context of the UN's activities.

My next point concerns Senator Schmitt's question about the impact of "technology transfer" on the processes of centralization and urbanization within less developed countries. This broad question relates to the varied trends of employment, agricultural production, and industrialization. I am not an expert on these subjects, but I would like to offer two brief comments. First, I think it can be shown that technology has been applied in ways that reinforce decentralization within a society; for example, to the degree that rural communities can gain employment and produce sufficient food and energy, there will be less incentive to move to cities. Second, this cluster of problems—employment, industrialization, urbanization—is being studied in some detail by one of the five panels convened by the National Academy of Sciences in its supporting study for the State Department regarding the materials needed for our national paper to be submitted to the UN Conference. Thus I believe that by next April, all of us will have a well-informed and updated analysis of this critical question.

Finally, I would like to emphasize one general point that Dr. Seitz and I mentioned in our testimony and that we also emphasized in the enclosed letter of October 31 to Dr. Frank Press. In general, we believe that the Congress and the Executive Branch need to give substantially more attention to the interactions among four areas of policy. The four policy-clusters are: (a) science and technology; (b) foreign diplomatic policy; (c) foreign economic policy; and (d) domestic economic goals. Enumerating these four topics is not particularly helpful in itself. But there has been far too little attention devoted to the interactions among our policies and programs cutting across these four areas. As a trivial example, if we had strong evidence that innovation and productivity were thriving at home, there would clearly be less controversy about helping to collaborate with LDCs in developing their technological and industrial infrastructures. Similarly, if we knew more about the most effective ways to achieve joint goals in technological collaborations with the LDCs, we would know what kinds of organizational structures we need in our own government to manage diplomatic and economic relations within both the so-called North-South and East-West frameworks. In short, I believe that the Subcommittee could be productive in pursuing several lines of inquiry with respect to the relationships among national science and technology policies with foreign policies.

Dr. Seitz and I stand ready to help you and the Committee in any way you may think is appropriate in the future.

Sincerely,

RODNEY W. NICHOLS, *Vice President.*

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THE ROCKEFELLER UNIVERSITY,  
New York, N.Y., October 31, 1977.

DR. FRANK PRESS,  
*Director, Office of Science and Technology Policy, Executive Office of the President, Washington, D.C.*

DEAR FRANK: The organizing members of the Council on Science and Technology for Development are pleased to respond to your letter of September 15, 1977 in which you asked us to consider the U.S. objectives and strategy in relation to the issues to be raised at the 1979 U.N. Conference on Science and Technology for Development.

We urge that the United States pursue a positive role in the preparation for the Conference. We should be prepared to offer a series of specific initiatives that clearly demonstrate our commitment to more effective use of our scientific and technological resources in support of U.S. national interests for international development.

Although this Conference could be an important event in a long process, the preparations ought to be taken even more seriously than the meeting itself. We recognize the frustrating limitations of world forums and the initially unsatisfactory efforts of the United Nations' staff responsible for the 1979 Conference. Nevertheless, the United States should walk the second mile to try to ensure that the Conference addresses its important theme effectively. However, if certain countries push the Conference's agenda toward contentious political issues, the position of the United States should remain sufficiently flexible that we could

pursue our objectives outside the framework of the Conference, without altering our commitment to helping the developing countries.

U.S. objectives will be realized—and the issues affecting our national interests will be managed successfully—only if the Government settles promptly on its strategy. Our primary objective should be to demonstrate leadership in conceiving new approaches and feasible programs. Such a course would enhance our global stature, particularly if we take full advantage of the opportunities for unequivocal communication at the Conference.

To achieve the objectives in the attached paper, we recommend that the United States adopt a *strategy* with four related elements: a global assessment; our country paper; a comprehensive effort to build our own initiatives; and a thorough evaluation of the proposals from developing countries, with specific attention to the political and economic issues that will arise.

*Global Assessment.*—The Conference affords the world community a unique opportunity to view its vast development needs from a broad scientific perspective—and, at the same time, to reevaluate our planet's great potentials as well as its perceived vulnerabilities. We should encourage and support a cooperative process with other nations—both industrialized and developing—to involve their scientists, engineers, physicians, and technical managers in such a global assessment. The goals should be to assess as thoroughly as possible the main factors—both man-made and natural—which will affect the world community in the short range and longer range future. This global appraisal, which should be an integral component of the preparatory process, would serve as the technical centerpiece of the Conference. It would help ensure broad participation at the Conference by developing country scientists as a counterweight to the heavy political representation.

To assure reasonable quality, rigor, and scope, the assessment must be elevated to a level above the work that normally enters into U.N. preparations. The assessment should integrate and expand the studies of previous U.N. conferences and related recent national activities such as on energy and food. If carried out well, the assessment could have a profound influence on all of the proceedings of the Conference as they move from general topics to specific problems and opportunities at the regional and national levels.

The U.S. government should soon urge the U.N. Secretary-General and LDC governments to consider the many advantages of making such an assessment and, in particular, stimulating the leadership of the world's technical communities to participate actively. In addition, we should explore the mechanisms for conducting the global assessment. The International Council for Scientific Unions might play a critical role if it decides in December to sponsor an appropriate group of experts who would be given both freedom and resources to carry out this task. In any event, your office could be helpful in encouraging a first-rank professional process linking governmental and private channels.

*Country Paper.*—The U.S. Country Paper should be a key element in shaping our national participation in the Conference and in moving the work of the Conference toward specific problems and programs. While responding to the U.N. guidelines wherever feasible, our Country Paper should build upon the current study by the National Academy of Sciences and then set forth the priority areas and key development goals emerging from a careful inter-agency analysis. The U.S. paper also should distinguish between those types of activities which are appropriate for action by the Government, by other U.S. institutions, and by combining government with the private sector. For example, urgent programs for food production call upon institutions and technical know-how quite different from the capabilities needed in the process of building the technological and educational base required for decades of future development.

*U.S. Initiatives.*—During the year between submission of our paper and convening of the Conference, the Government should take the lead in developing a series of specific initiatives that bring together both public and private sectors. Furthermore, the Government should establish the organizational and financial basis for implementing such initiatives so that our plans may be presented fully and authoritatively at the Conference. The initiatives, reflecting our priorities, should focus upon the particular U.S. scientific and technological capabilities that would be most relevant to the needs of developing countries. This policymaking process will benefit greatly by distilling the varied experience we have gained from collaborative efforts that have worked well or poorly in the past.

*Response to Developing Country Initiatives.*—The country papers of some of the developing countries will probably present their proposals for new approaches

and programs. These suggestions should be evaluated carefully in preparing our final proposals for the Conference. Political and economic demands, often cloaked and justified in moral terms, will arise inevitably. They must be met firmly by well-informed analysis of individual issues and by alternatives consistent with our interests.

The success of the United States' delegation at the Conference will depend heavily upon whether we have stimulated the willingness and orchestrated the capabilities of U.S. governmental and private institutions to implement realistic programs. These programs must be designed to support the developing countries in building their own capabilities for applying science and technology to their own advancement. In short, if the U.S. demonstrates positive leadership—through participation in the cooperative global assessment, encouragement of broad participation by LDC professionals, preparation of a persuasive U.S. Country Paper, and formulation of strong U.S. initiatives—we can minimize the chances that other nations will be able to derail the Conference into unrealistic conflicts.

Finally, we ask you to consider the importance of the President and the Secretary of State devoting their influence to help in mobilizing the scientific and industrial leadership in the United States to prepare for the Conference. With your interest and their attention on an early and continuing basis, the Conference could become a significant milestone in improving our relations with—and the conditions in—the developing world.

The members of the organizing group of the Council would be pleased to meet with you and other Government officials to explore these issues further.

Sincerely,

FREDERICK SEITZ.

Enclosure: U.S. Strategy and Objectives for U.N. Conference in 1979.

- I. International Factors Bearing on the U.S. Position
  - A. Conference Process
  - B. Conference Theme
  - C. Foreign Policy Framework
  - D. Views of Scientific Community on Global Problems
- II. U.S. Objectives
  - A. Overall Opportunity
  - B. Three objectives
  - C. Characteristics of Successful Conference
- III. U.S. Strategy
  - A. Global Assessment
  - B. Clustering Problems and Establishing Priorities
  - C. Modes of Cooperation
  - D. U.S. Policies, Activities, and Institutions
  - E. International Policies, Programs, and Institutions
  - F. Specific Programs in Developing Countries
- IV. U.S. Tactics
  - A. Country Paper
  - B. Initiatives
  - C. Responding to Developing Countries
  - D. General Concerns
- V. Issues Affecting U.S. Interests
  - A. Four Categories of Immediate Concern
  - B. Other Problems of Long Term Action

#### U.S. OBJECTIVES AND STRATEGY FOR THE U.N. CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

The Organizing Group of the Council on Science and Technology for Development submits this paper in response to the letter of September 15, 1977, from Dr. Frank Press, requesting:

"... a coherent statement as to what our objectives and strategy might be and what issues will affect our national interests at this Conference."

#### I. INTERNATIONAL FACTORS BEARING ON THE U.S. POSITION

##### A. Conference Process

The major U.N. Conferences, from Human Environment to Desertification, have met with rising criticism within and outside the United Nations. Rene Dubos comments:

"Whatever the subject discussed, the megaconferences were conducted according to much the same pattern as if they had to follow a preordained ritual. They began with resounding statements of critical global problems and with a clarion call for international cooperation. As soon as the substantive deliberations began, however, they became platforms for political manifestos that generated intense political controversies. Any concern for concrete problems was hopelessly diluted in a flood of ideological verbiage . . . The final stage of the ritual was a declaration so broadly and vaguely worded as to save face for all participants and avoid committing them to a specific course of action."

However, as Dr. Dubos notes, the series of conferences "has served the purpose of generating a global awareness of certain dangers that threaten all nations rich and poor." They focus world attention on complex and demanding problems, on problems that must be grasped in a global sense even as they must be dealt with in a specific and local way. In this, the conferences create an international political mandate for decision-makers in governments and international agencies to act on environmental, food, population, and such issues.

#### *B. Conference Theme*

The theme is timely, vitally important, and so wide and pervasive that scale threatens quality. It is seen as the culmination of previous assemblies, yet its scope exceeds even the accumulation of the earlier themes. Also, the Conference permits—in fact, demands—consideration of the *links between* food, environment, population, industrialization, and other sectors dependent in part upon science and technology. The crucial importance of these links (and the related trade-offs) in an interdependent world hardly needs to be mentioned.

#### *C. Foreign Policy Framework*

In the period since the OPEC petroleum action of 1973, U.S. foreign policy has concentrated increasingly on the maintenance of world order. This has involved recognition of issues on a "global agenda" including food, population, and environment, as well as enhanced priority for relations with the developing world. In turn, this recognition suggests "the fragile flickerings of universal consciousness", a new perception of man's prospects for survival.

Seen in these foreign policy terms, the Conference could and should offer an unusual opportunity for the United States and the world community to reassess what President Carter describes as "the new global questions of justice, equity and human rights." However, the United States still confronts intense political pressure from certain developing countries seeking massive economic change in the world.

#### *D. Views of Scientific Community on Global Problems*

Individuals and institutions in the United States and abroad, as well as international scientific, engineering, and medical organizations, have been appraising and speaking out on a range of problems before the world. They have shown growing concern about our capability to grapple with such problems as rising populations, intensified energy demands, and materials-intensive industrialization. As the world of 1979 assays preferred courses to improve the condition of 80 percent of a population which will reach at least six billion by the year 2000, prudent understanding of the earth's riches and its vulnerabilities is imperative.

An considerable body of work is available to facilitate a scientific appraisal of the state of the globe: the proceedings and follow-up activities of past U.N. World Conferences, the work of the International Council of Scientific Unions (ICSU) and the Scientific Committee on Problems of the Environment (SCOPE), the present research on global trends of the International Federation of Institutes of Advanced Studies (IIASA), and the range of the National Academy of Sciences (NAS) such as Food and Nutrition, as well as Energy and Climate. An integration and broadening of these efforts is now in order.

### II. U.S. OBJECTIVES

#### *A. Overall Opportunity*

Given the unparalleled strength of the United States in science and technology, the Conference provides an unusual opportunity for the United States to assume a leadership role in developing new approaches and specific international programs for more effective application of science and technology to development. Such leadership would contribute to our global stature in a variety of areas. At the same time, a demonstrated commitment to improving the mobilization of U.S. technical strengths, for a major attack on global problems, and

particularly the resources of the private sector, could contribute significantly to a better basis for U.S. relations with the developing countries.

### *B. Three Objectives*

U.S. objectives at the Conference could be grouped into three categories: Improving the opportunities for and effectiveness of U.S. efforts to respond to development needs, with attention to basic human needs, by establishing a framework for an expanded range of collaborative programs.

Enhancing the prospects for world stability through improved understanding of global problems and opportunities; increased scientific interdependency; accelerated development of local capabilities; and broadened collaborative efforts.

Promoting U.S. national interests including expanded global trade and export opportunities; continued access to raw materials; new opportunities and an improved environment for private foreign investment; and additional possibilities for using in the United States the results of scientific and technological developments abroad.

### *C. Characteristics of a Successful Conference*

Among the ingredients of a successful conference are (a) broad participation in the entire Conference process by leading scientists, engineers, and physicians from the developing countries; (b) a Conference agenda that emphasizes consideration of specific collaborative opportunities in science and technology as well as appropriately analytical consideration of issues that may be politically contentious; and (c) a series of Conference actions which reflect a sense of global priorities in applying science and technology to development and which establish an improved international organizational framework for addressing the most urgent problems. The Conference should stimulate a climate within developing countries receptive to their own generation and application of science and technology, thereby reinforcing their small and often isolated professional communities. The Conference also should contribute to improving the performance of and cooperation between the U.N. agencies in this field.

## III. U.S. STRATEGY

In view of the foregoing considerations, the U.S. strategy should range from the stimulation and support of a scientific assessment of global problems to formulating a set of specific program initiatives.

### *A. Global Assessment*

The Conference should provide the occasion for an authoritative review of the major threats, concerns, and potentials facing the world community from the year 1979 forward. This scientific perspective of the globe should provide an analysis of forces and influences, man-made and natural, that will impinge on all countries and must be taken into account in development planning. The various studies mentioned above, together with available sector studies, provide a base for this "forward edge" integrated assessment.

As a first step, one of the very limited number of "global scientists" should be asked to take on the responsibility of mobilizing a group of the world's leading experts, including a significant number of leading scientists and technologists from the developing countries, and by 1979 completing an authoritative assessment of global problems from a scientific perspective. The assessment process would be a clear manifestation of the international scientific and technological community's commitment to work for international development.

The U.S. Government should support this international effort, financially and diplomatically, to change the acceptability of the final product as a technical centerpiece for the Conference. To this end, the effort should be sanctioned by the U.N. Secretary General as an integral component of the Conference process.

The assessment must be recognized as an overreaching framework of concerns within which specific Conference activities fall. If it is accepted in this light, the participation of developing country scientists and technologists throughout the Conference process will be greatly enhanced, and the diplomatic polemics at the Conference table somewhat muted.

The international mechanism for carrying out the assessment needs further exploration. The primary consideration is the caliber and experience of the scientists and engineers participating in the endeavor. ICSU, for example, will be considering in December its contribution to the Conference and would probably be interested in participating in such an assessment. Other organizations such as IFIAS might also be involved.



### *B. Clustering Issues and Establishing Priorities*

Concurrent with its participation in the international effort to assess global problems, and to ensure that these scientific and technological findings are solidly incorporated into the Conference proceedings, the United States should confine with the development of its own approach. The clustering of development problems into manageable groups adopted by the NAS provides an excellent starting point for this effort. These clusters are:

- health, population, and nutrition
- natural resources, energy, and environment
- food, water, soil, and climate
- employment, trade, and industrialization
- urbanization, transportation, and communication

The many linkages within each cluster and between the clusters should be stressed. Priorities for national and international attention should be identified with these linkages in mind.

While this activity is currently a unilateral effort, we should encourage other nations similarly to begin to narrow down the number of potential problems to more manageable groupings of priority areas. Specifically, we should be prepared to share promptly the results of the NAS effort, seek international reactions to the recommendations, and stimulate comparable efforts by other nations.

### *C. Modes of Cooperation*

The next stage of analysis, conducted by appropriate public and private institutions, should be directed to approaches and modes of cooperation between advanced and developing countries or among developing countries or on the part of international or regional institutions. Past successes and failures should be identified and analyzed, and new opportunities suggested in areas such as:

- scientific and technological exchanges
- manpower, education, and training required for improved indigenous capabilities
- building local development and research capacity management in applying science and technology
- utilization of the capabilities of local and international industry
- priorities for U.S. Government research and development to be related to development problems

Again, in the first instance, this would be a unilateral endeavor, but with the analyses in hand, the reactions of other countries should be solicited well before the Conference. Other nations, and particularly the developing countries, should be encouraged to give comparable attention to these areas.

### *D. U.S. Policies, Activities, and Institutions*

### *E. International Policies, Programs, and Institutions*

### *F. Specific Programs in Developing Countries*

Items D, E, and F, which concern the activities to carry out the strategy, should comprise the core of the U.S. position at the Conference. These should demonstrate an easily visible U.S. commitment to expanded program efforts. Among the many initiatives that should be considered are regional energy institutes, an International Development Foundation within the U.S. Government, and an expanded role for corporations in the areas of training and support of research and development in the developing countries. The transferability of the successes of the international agricultural research institutes to other sectors deserves careful study. The NAS study will undoubtedly suggest many other specific activities that might be considered. Where feasible, measures-of-evaluation ought to be worked out in reasonable detail.

In the Conference process, the preparation and processing of the developing countries' papers will probably reveal closely related problems and issues which the United States should analyze prior to setting forth our final position. A coherent strategy must be designed to respond specifically to these matters within a necessarily global perspective.

## **IV. U.S. TACTICS**

### *A. The Country Paper*

The U.S. Country Paper is clearly a key element in shaping the U.S. participation in the Conference. Given the early deadline for submission of the Paper, it seems unlikely that the Government will be in a position to propose major new

departures for collaboration with the developing countries at that time. Similarly, the private sector, and particularly the important corporate sector, may not be ready to set forth an array of new approaches.

Drawing on the work of the NAS, the Paper can and should identify priority areas and key development problems, review our past and current approaches to collaboration, and describe the types of new approaches that might be considered. Perhaps the NAS report, which will probably contain many interesting ideas not embodied in the officially cleared Country Paper, could be appended to the Paper as a stimulus for discussions prior to the Conference. Such discussions could improve the perception of the U.S. Government and of the private sector of the priorities of the developing countries in the light of U.S. capabilities.

#### *B. Initiatives*

During the more than one year between submission of the Country Paper and the convening of the Conference, the U.S. Government should take the lead in developing the series of new initiatives suggested above involving both the public and private sectors, and the organizational and financial basis for their implementation. These initiatives should then be presented at the Conference.

#### *C. Responding to the Developing Countries*

As noted above, the Country Papers of the developing countries should be given thorough consideration in preparing the specific U.S. proposals for presentation at the Conference.

#### *D. General Concerns*

Of critical importance is the concept that the Country Paper, as well as the U.S. position at the Conference, reflect not only the interests and initiatives of Government agencies, but also the interests and initiatives of private institutions, and particularly the corporate sector.

In preparing the Country Paper and the U.S. position for the Conference, care should be taken so as not to create false expectations as to the power of science and technology. The limitations and costs of science and technology are very real, and many economic, social and political factors bear on the impact of technological advances in development. Also, in many instances the United States will be prepared to transfer technology but the developing countries will not be in a position to absorb the technology. Therefore, the totality of the conditions surrounding proposed collaborative efforts must be carefully examined.

### V. ISSUES AFFECTING U.S. INTERESTS

#### *A. Four Categories of Immediate Concern*

The issues which will be encountered by the U.S. Government prior to and during the Conference fall into four categories:

The capacity and readiness of U.S. Governmental and non-governmental institutions to implement coherent programs which will support efforts of the developing countries to improve their capabilities to apply science and technology to development. Critical sub-issues include: the poor meshing of U.S. domestic and foreign policies bearing on relations with the developing countries; and the organizational, manpower, financial, and intellectual constraints in both the public and private sectors.

The rising concern in U.S. labor and business circles about the declining competitiveness of such U.S. industries as electronics, steel, and motor vehicles, and about the export of technology which is often accelerating this decline and resulting in the loss of jobs.

The likelihood that at least some developing countries will attempt to politicize the Conference, into an UNCTAD-type forum and seek support for sweeping resolutions that emphasize the more controversial aspects of the New International Economic Order such as aid levels, trade policies, and activities of multinational corporations. Of concern already are the uncertain attitudes and uncoordinated activities of the U.N. staff; the orientation of the Agenda for the Conference; and the emerging tone and content of the country and regional inputs from some of the developing country representatives.

The practical problems in attempting to develop and work out the details of improved and new approaches to international collaboration, and particularly and major new initiatives that the United States might propose Central to this

issue is the chaotic state of affairs within the U.N. family of agencies, each seeking a greater piece of the action in science and technology. Also of concern are: the usual problems of financial arrangements; bilateral vs. multilateral approaches; extent of LDC participation in determining the character of U.S. programs; and appropriate roles for private organizations.

#### *B. Other Problems of Long Term Action*

Another set of issues will arise in implementing any commitments made or implied at the Conference. At the top of the list is the inadequacy in our understanding of the potential contribution, and the limitations, of science and technology in the entire development process. There also are many unsolved problems in adapting science and technology to the varied conditions in the developing countries and in anticipating the impact of the infusion of technology on urbanization, employment, environment, and cultural and social values. Further complicating the aim for effective, long term action is the lead time involved in building scientific, technological, and managerial infrastructures in the developing countries.

#### PARTICIPANTS

The following individuals who have been actively involved in the initial organizational efforts of the Council were provided the opportunity to contribute to the preparation of this response. Two dinner meetings were held on October 12 and 13 to develop the response. The attendees at those meetings are indicated by (\*\*). Other individuals who contributed substantive inputs are indicated by (\*).

Dr. William O. Baker, President, Bell Laboratories.

Dr. John Baldeschwieler, Chairman, Division of Chemistry & Chemical Engineering, California Institute of Technology.

Dr. Ivan Bennett, M.D.,\*\* Dean, School of Medicine, New York University Medical Center.

Dr. Lewis Branscomb,\* Chief Scientist and VP for Research, IBM Corp.

Dr. Harvey Brooks, Professor, Harvard University.

Dr. Harrison Brown, Director, Resource Systems Institute, East-West Center.

Dr. John H. Bryant, M.D.,\*\* Director, School of Public Health, Columbia University.

Dr. Carl Djerassi, Department of Chemistry, Stanford University.

Dr. Paul M. Doty,\*\* Program for Science & International Affairs, Harvard University.

Dr. Herbert Fausfeld, Director of Research, Kennecott Copper Corp.

Dr. George Hammond, Merrill College, University of California at Santa Cruz.

Dr. Philip Handler, President, National Academy of Sciences.

Dr. Bruce Hannay,\*\* Vice President, Research & Patents, Bell Laboratories.

Dr. William Hewlett, President, Hewlett-Packard Co.

Robert Kreller,\*\* Executive Vice President, Alfred P. Sloane Foundation.

Dr. Franklin Long,\*\* Program on Science, Technology & Society, Cornell University.

Dr. Thomas F. Malone,\*\* Director, Holcolm Research Institute, Butler University.

Dr. Walsh McDermott, M.D., The Robert Wood Johnson Foundation.

Dr. David Pimentel,\* Professor, Cornell University.

Dr. Simon Ramo,\* Vice Chairman of the Board & Chairman of the Executive Committee, TRW, Inc.

Dr. Roger Revelle, Center for Population Studies, Harvard University.

Dr. Walter Orr Roberts,\* President, University Corporation for Atmospheric Research.

Dr. Peter Rogers, Professor, Environmental Engineering, Harvard University.

Dr. Glenn Seaborg,\* Lawrence Berkeley Laboratory, University of California at Berkeley.

Dr. Frederick Seitz,\*\* President, Rockefeller University.

Dr. Guyford Steyer, National Academy of Sciences.

Dr. Alvin Weinberg, Institute for Energy Analysis, Oak Ridge Laboratories.

Dr. Thomas H. Weller, M.D.,\* Chairman, Department of Tropical Public Health, Harvard University.

Dr. Carroll Wilson, Professor of Industrial Management, Massachusetts Institute of Technology.

In addition, the following individuals concerned with science, technology, and development participated in the dinner meetings:

Dr. Philip Abelson, Editor, *Science*.

Dr. Jack Berman, Professor of International Business, University of North Carolina.

Dr. Joel Bernstein, Office of the Foreign Secretary, National Academy of Sciences.

Mr. James Chace, Managing Editor, *Foreign Affairs*.

Mr. James Grant, President, Overseas Development Council.

Mr. Roger Hansen, Overseas Development Council.

Mr. Hugh Miller, Office of the Foreign Secretary, National Academy of Engineering.

Dr. Gustav Ranis, Center for Economic Growth, Yale University.

Dr. Victor Rabinowitch, Office of the Foreign Secretary, National Academy of Sciences.

Mr. Stephen Stamas, Vice President, Exxon Corp.

The preparation of the response was coordinated by:

Charles S. Dennison, Board on Science and Technology for International Development, National Academy of Sciences.

Rodney Nichols, Vice President, The Rockefeller University.

Glenn E. Schweitzer, Cornell University.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT,  
Washington, D.C., December 20, 1977.

HON. ADLAI E. STEVENSON III  
Rayburn Senate Office Building,  
Washington, D.C.

DEAR SENATOR STEVENSON: Thank you again for the opportunity of testifying before your Subcommittee on Science, Technology and Space on the subject of preparation for the 1979 UN Conference on Science and Technology for Development. I would like to briefly amplify the answer to one question asked towards the end of the hearings on December 15. You asked for specific ways for the U.S. to commit itself to Conference followup at this time. By publicly stating the U.S. commitment to follow up the recommendations of the conference, urging other countries to do so and urging the United Nations to include a followup mechanism to the Conference, the U.S. would help to ensure that something indeed is done. I am not seeking new super institutions to do this since there are already institutions in the UN system that can carry out and assist in carrying out followup activities. Certainly the same is true within the U.S. government. What we need is an understanding that questions of International Science and Technology policy should be given increased priority by the Office of Science Adviser and others connected with the U.S. Science and Technology machinery.

Yours sincerely,

ROBERT E. STEIN,  
Director, North American Office.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT,  
Washington, D.C., December 20, 1977.

HON. HARRISON H. SCHMITT,  
Dirksen Senate Office Building,  
Washington, D.C.

DEAR SENATOR SCHMITT: At the hearings of the Subcommittee on Science, Technology and Space on December 15, you asked me to submit some additional views on how "others" in addition to governmental and Science and Technology representatives could be included in the Conference process. My written statement on pages 10-12 contains a number of suggestions on this subject. In addition, I would divide participation into several parts. First, getting ideas from "others." This should be a very broad process and the National Academy of Sciences meetings and those that the State Department indicated it would hold in the next year are steps in the right direction. But those meetings will have a limited attendance and what is needed is a channel of communication to a wide number of people on a more or less regular basis over the next eighteen months. A focal point, such as Ambassador Wilkowski's office is also desirable for people to get more information about the doings of the Conference. Specifically, before the UN

Conference on Human Settlements, the Department of Housing and Urban Development opened a HABITAT Center designed, although not implemented that successfully, to provide a central focus for both receipt of information from a wide variety of those who had it on matters relating to the Conference as well as disseminating information about related activities of agencies and others. Perhaps a similar center could be considered, although something more modest by way of a particular staff team would be sufficient.

A newsletter which might come out quarterly could provide some of this information to a wide variety of people and provide the opportunity for exchange. I hope that the idea will be taken up by those in the Executive Branch. Finally, there could be an attempt to use annual meetings of scientific and professional organizations as vehicles for discussing issues of importance to the Conference. Although there is usually a fairly long lead time it certainly will be possible to work into the schedule for late 1978 and early 1979 which would permit input into the final U.S. position for the Conference itself. On the same score, I would hope the U.S. would encourage those professional organizations which have "international meetings" to consider holding their meeting about the time of the UN Conference in Vienna where the Conference will be held.

The second category of including "others" is in the decisionmaking process itself. This is a more difficult and inevitably has to be a more selective process. At the same time if this is to be a Conference in which the positions of the U.S. are to be accepted by a wide variety of individuals, some representation will have to be planned for them in the decision-making mechanisms of government. For that reason both in my testimony and earlier I suggested an inter-agency group which would include individuals from a variety of groups. Both the Water and Decertification Conferences had "an open-ended" group permitting anyone who wishes to come and participate to participate. The same approach might be used or something slightly more structured. This group should be asked to participate (a) in review and consideration of the national paper, (b) in the formulation of the U.S. position for the various preparatory committees and the Conference itself, and (c) in a group that I believe should be established before the Conference to oversee its implementation. A final category of inclusion would be to select members from the "others" category to be on the U.S. delegations to the preparatory committees, to the Conference and to any international followup activities which may take place.

I hope these comments are helpful.

Yours sincerely,

ROBERT E. STEIN,  
*Director, North American Office.*

TRANET,  
*Rangely, Maine, January 2, 1978.*

Hon. ADLAI STEVENSON,  
*U.S. Senate,  
Washington, D.C.*

DEAR SENATOR STEVENSON: This letter is in reply to the questions of Senator Schmitt and you at the hearings on December 11 with respect to U.S. participation in UNCTSD.

1. What actions should be taken to assure that "others" (groups other than big labor, big science, big government and big industry) be represented at UNCTSD?

1. One of the most innovative segments of American society might be called "the A.T. community". There are, perhaps, 200 or 300 groups in the U.S. who are developing, using and testing small scale, low-cost, community level technologies. These technologies and the capability to develop them are much closer to the needs of the Third World than are the technologies of the multinational corporations. Unlike other segments of the U.S. community none of the A.T. groups have funds or staff to develop their views or take part in UNCTSD preparations.

UNCTSD funds should be set aside and the A.T. developers in the U.S. should be solicited to develop position papers on how they could contribute to Third World development.

2. Comparable A.T. groups have been developed in many Third World nations. They are closely associated with the poorest people of the developing countries and seldom obtain adequate financial support or recognition from governmental elites.

The U.S. should provide support so that Third World A.T. groups may meet with one another and with their U.S. counterparts at non-governmental forums developed in conjunction with UNCTSD.

3. Looking beyond UNCTSD and for positive actions from this period of reevaluating the effect of science and technology on human developments.

The U.S. delegation for UNCTSD should develop an interchange program between A.T. Centers in the U.S. and the Third World. And, it should recommend at UNCTSD that this interchange be made part of an international cooperative network.

4. Other groups of "others" that should be brought more actively into UNCTSD preparations are the many citizen action groups which are concerned with development and our global future. Church groups and voluntary agencies, such as; The World Council of Churches, Institute for International Policy, and Friends Service Committee, have been more effective than governmental agencies in many developing countries. Major changes in our own view of the use of natural resources are being brought about by Friends of the Earth, The Sierra Club, Worldwatch, and other non-governmental organizations. Many similar and smaller groups have proven their effectiveness but do not have the resources available to big governments, big labor, big business and big science to make their views known or to expand their programs.

The U.S. Congress should assure by policy statements and financial support, that UNCTSD include a non-governmental forum for which these groups can prepare independent papers and at which they may exchange views with other groups concerned with science, technology and human development.

5. Since your hearings on December 15, 1977, Vienna, Austria has been selected as the site of UNCTSD. This places less pressure on the U.S. to take a lead role in supporting an NGO-Forum. However, our national commitment to human rights suggests that we offer the Austrian government our financial support toward a forum which will give all people the chance to express their views.

The U.S. Congress should make immediate contact with the Austrian government and offer its assistance in promoting a non-governmental Forum on science, technology and human development.

II. What might be done to arrest the disastrous rural-urban migrations in the developing nations?

1. Urbanization is a requirement of our past technologies developed on the principle that bigger is better. The Third World is today in a position to choose technologies that do not lead to the pollution, crime, and urban blight which results from over crowding.

Some scholars have proposed a moratorium on the transfer of industrial technology to prevent the too rapid growth of Third World cities. I cannot fully reject the arguments put forward to favor this view. However, it is probably more realistic to promote the development and use of alternative technologies which make it possible for rural people to enjoy the benefits they expect in the city. First among these is creative employment at the family level. This means new technologies geared to rural needs and rural resources.

In addition much about the rural/urban balance may be learned from examining our own demographic pattern as I have in a recent article "The New Ruralism" in the summer 1977 issue of *Habitat*. Since 1970 the U.S. has seen a startling reversal of the nearly century long growth of cities and suburbs. Today our most rural areas and small towns are becoming our centers of growth.

Technology is playing a key role in this urban to rural transition. Communication technologies are particularly important. Today I can run a world wide business from a town of 500 people in Northern Maine primarily by telephone. And can maintain contact with colleagues throughout the world through a network of ham radios.

Urban congestion can be brought to an end by careful development of the technologies and the infrastructure required for the future endowments of rural areas.

Transferring the technologies developed for our own urban-industrial world will only increase urbanizations.

The U.S. should support the growth and development of the A.T. Centers in the Third World and of similar centers in the U.S. which are developing low-cost self-help technologies for rural areas.

I am most pleased to have had the opportunity to discuss these ideas with you and look forward to your continued interest in the plans for UNCTSD.

Sincerely,

WILLIAM N. ELLIS.

THE STANLEY FOUNDATION,  
Muscatine, Iowa, December 2, 1977.

Senator ADALI E. STEVENSON,  
Chairman, Subcommittee on Science and Space,  
Washington, D.C.

DEAR SENATOR STEVENSON: We note your scheduled December 15 hearing on the United Nations Conference on Science and Technology for Development in 1978. The attached report summarizes discussions and participant recommendations on this subject as discussed at our recent Strategy for Peace Conference.

As an impartial NGO dedicated to international understanding, we wish share this information with you as you prepare your input into U.S. preparation. We hope this report might be helpful background material.

Sincerely,

JACK M. SMITH, *Executive Director.*

#### SCIENCE AND TECHNOLOGY: INTERNATIONAL DEVELOPMENT

#### A REPORT OF THE EIGHTEENTH STRATEGY FOR PEACE CONFERENCE\*,

October 13-16, 1977, Airlie House, Warrenton, Va.

(Sponsored by The Stanley Foundation Stanley Building Muscatine, Iowa)

#### GROUP PARTICIPANT LIST

Chairman: Ward Morehouse, President, Council on International and Public Affairs.

Rapporteur: Brijen K. Gupta, Consultant and Senior Fellow, Program on International Science and Technology Affairs, Council on International and Public Affairs.

G. William Anderson, Legislative Assistant, Office of Representative Claren Long.

Henry Arnold, Director, Office of Science and Technology, Agency for International Development, U. S. Department of State.

Ramesh Diwan, Professor of Economics, Rensselaer Polytechnic Institute.  
William Ellis, TRANET.

Lawrence Fox, Vice President for International Economic Affairs, National Association of Manufacturers.

Roy Harrington, Product Planner, Deere and Company.

Samuel Hayden, Director of Washington Programs, Council of the Americas

V. J. Ram, Principal Adviser to the Secretary-General of the U.N. Conference on Science and Technology.

Triloki N. Saraf, Deputy Representative at the United Nations, Food and Agriculture Organization Liaison Office with the United Nations.

Jean Wilkowski, U.S. Coordinator, U.N. Conference on Science and Technology for Development, U.S. Department of State.

Affiliations are listed for identification purposes only. Officials and employees of the United States, foreign countries, or international organizations, although they participate in the discussions, are in no way committed to any position or findings of the discussion group.

The views expressed in this report represent the general consensus of the participants in the discussion group. However, they are not necessarily the views of The Stanley Foundation or of all members of the conference. Moreover, members supporting various parts of the report do not necessarily endorse it in its entirety or specific language.

\*An annual conference dedicated to a reevaluation of U.S. foreign policy, the Eighteenth Strategy for Peace Conference was attended by 87 participants from a wide spectrum of disciplines. Six discussion groups met simultaneously to consider the following topics: Non-Proliferation Strategy for the late 70s; Human Rights and U.S. Foreign Policy; Problems of International Security in Outer Space; Science and Technology: International Development; U.N. Special Session on Disarmament: U.S. Initiatives; Southern Africa: U.S. Policy Options.

The complete conference report will be published in December 1977.

## SCIENCE AND TECHNOLOGY: INTERNATIONAL DEVELOPMENT

*Background to the 1979 U.N. Science and Technology Conference and the United States Policy.*

The United Nations Conference on Science and Technology for Development (UNCSTD) is scheduled to be held in August-September 1979. The main objectives of the Conference are:

(a) To adopt concrete decisions on ways and means of applying science and technology in establishing a new economic order;

(b) To strengthen the technological capacity of developing nations so as to enable them to apply science and technology to their development;

(c) To adopt effective means for the utilization and technological potentials in the solution of problems of development of national, regional and global significance;

(d) To provide instruments of cooperation to developing countries in the utilization of science and technology for solving socio-economic problems that cannot be solved by individual action, in accordance with national priorities.<sup>1</sup>

In an effort to focus the Conference on a more meaningful range of issues, the Committee on Science and Technology for Development (CSTD), a standing committee of the United Nations Economic and Social Council (ECOSOC), which was designated as the Preparatory Committee for the 1979 Conference, has stipulated that there shall be no more than five subject areas on the agenda, that these shall be clearly designated and limited in scope, and that member states will be expected to prepare country papers linking individual national needs in science and technology to social and economic priorities. Though the precise agenda of the 1979 Conference is yet to be determined, the overall goal of the Conference has been set forth by the General Assembly Resolution at its Sixth Special Session in 1974 as contributing to the realization of an international economic system "based on equity, sovereign equality, interdependence, common interest and cooperation among all States, irrespective of their economic and social systems, which shall correct inequalities and redress existing injustices, make it possible to eliminate the widening gap between the developed and the developing countries and ensure steadily accelerating economic and social development and peace and justice for present and future generations."<sup>2</sup> This view thus clearly recognizes the reality of interdependence of nations, developed and developing, and of the need to evolve a world economic order while maintaining the cherished concept of national sovereignty. Furthermore, this formulation stresses the need to correct the inequitable distribution of wealth both within and among countries, and urges not merely economic growth but economic and social development in order to arrest growing equity crisis within most nations.

The new U.S. Administration has been re-examining a wide range of U.S. policies in response to the call for a new international economic system. In his Statement to the World on Inauguration Day last January, President Carter pledged this country's cooperation in combatting four pernicious enemies of mankind—poverty, disease, hunger and political repression—and this country's willingness to join other nations in seeking equitable development of the world's resource and the proper safeguarding of the world's environment. As a further expression of this country's concern with the objectives of UNCSTD, the present Administration has reiterated its willingness to host the Conference in 1979. Enlightened opinion in the United States while recognizing the limitations of science and technology in the complex process of social and economic development has, in the well chosen words of C. Maxwell Stanley affirmed that "intelligent transfer of science and technology, properly applied to the needs of labor intensive economies, can stimulate economic and social growth," and that the United States "should be in the forefront helping to develop more effective procedures and mechanisms for transfer of suitable science and technology."<sup>3</sup>

<sup>1</sup> United Nations Economic and Social Council, Committee on Science and Technology for Development, *Report on the Third Session (2-26 February 1976)*, Official Records, Sixty First Session, Supplement No. 3 (Emphasis added).

<sup>2</sup> United Nations, General Assembly, Sixth Special Session, 2229th Plenary Meeting, *Resolution Adopted 1 May 1974*.

<sup>3</sup> Opening Remarks, Eighteenth Strategy for Peace Conference (The Stanley Foundation), Airline House, Warrenton, Virginia, October 13, 1977.



### *Boundary Conditions and Assumptions*

The discussion group defined its task as that of examining the role of science and technology in international development in view of the call for a new international economic system, and to determine what fresh and realistic initiatives should be undertaken by the United States bearing in mind the role of other nations in an increasingly dependent world. Three assumptions guided our discussion.

1. Science and technology are not magic but only one set of variables in the process of economic and social change. Likewise investment though a crucial variable is not the ultimate factor in socioeconomic development. But technological and investment choices do matter and the autonomous capacity to create, acquire, adapt and use technology to meet critical economic and social problems is vital to all countries.

2. Developing countries—and the peoples and institutions within them most immediately involved—are best able to define the objectives and needs which can be served by new forms of technology.

3. We are confronted with a global equity crisis of arresting proportions, marked by widespread poverty, sharp income inequality, and severe unemployment, underemployment, and employment at very marginal rates of productivity. In the coming decade this equity crisis will grow. To deal with it radically different development strategies are needed to replace the "trickle down" efforts made over the past 30 years.

Given these circumstances, some members of the group felt a recent statement by Father Theodore Hesburgh, Chairman-designate of the U.S. Delegation to UNCSTD, underscored what should be the central thrust of the Conference and U.S. participation in it: "In simple terms, the goal of the Conference is to improve poor people's lives by finding the best ways of bringing the benefits of science and technology to them."<sup>4</sup>

### *Objectives of UNCSTD*

The group agreed that the United Nations Conference on Science and Technology involved varied objectives. Some objectives are of concern to all nations; others have a greater relevance to developing countries; a few others were pre-eminently of importance to the developed nations. For instance no nation of the world can be oblivious to the serious magnitude of the equity crisis among developed and less developed nations, and within a large number of such nations. Enhancing the quality of environment, proper and equitable utilization of natural resources and energy, improving the quality of life and human rights consistent with each nation's cultural tradition, fostering better demographic equilibrium, increased employment possibilities, and equitable growth without runaway inflation are some of the goals and objectives shared by all mankind.

It was further agreed that developing countries had a special objective of creating through their own efforts and the cooperation of developed countries a self-sustaining economic and social development which at its foundation would provide an adequate and nutritious diet, and significantly better housing facilities and health care than that presently experienced by the world's poor. Some members of the discussion group suggested that alteration of life styles in developed countries which are based on over-consumption of world's resources and which created both waste and pollution of the earth's resources and environment needed to be taken as a serious objective by the industrialized countries.

The group agreed that UNCSTD must consider several clusters of issues or topics as pertinent to the creation of a new international economic and social system. Among those suggested were these:

1. Population, Poverty, Health, Food and Nutrition.
2. Energy, Natural Resources, and Environment.
3. Climate, Soil and Water.
4. Employment, Trade and Industrialization.
5. Urban Settlements and Rural Development.<sup>5</sup>
6. Education and Manpower Training.

<sup>4</sup>Statement at Symposium on Nongovernmental Initiatives Related to U.S. Participation in The 1979 UN Conference on Science and Technology for Development, Washington, D.C., September 20, 1977.

<sup>5</sup>These five clusters of issues were formulated by Frederick Seitz in "An Outline of Issues and Suggestions for the United States to Consider in Programs of Science and Technology to Meet the Goals of Developing Nations," A Working Paper, dated 29 December 1976, signed by 29 leading U.S. scientists, and forwarded to President Elect Jimmy Carter under cover letter of 30 December 1976 (unpublished).

## 7. Science and Technology Infrastructures.

### 8. Indigenous Research and Development.

In one way or another most developing countries and to some extent the developed countries are affected by these clusters of issues, or individual issues within a given cluster. It could not be said that all developing countries faced these clusters of issues with equal urgency. Therefore there could be no general prescription for solving these issues or problems because problems are country-specific, region-specific, and time-specific. It was repeatedly pointed out that no single issue could ever be resolved by the application of science and technology alone. Science and technology can indeed assist in providing the solution, but the importance of other factors-- social, political, economic, and cultural-- cannot be overlooked.

Indeed the assistance of science and technology to the solution of these problems can be most effective only when this science and technology is applied by persons closest to the situation, for they alone have the capability of seeking out a scientific and a technological strategy most consistent with their human, cultural, and other factor endowments. The world community should seek to provide to each individual nation access on reasonable terms to all relevant science and technology, but the decision on which technology is to be applied, and how, rests with the people of a country or region.

The preparation of country papers appeared to be generating a momentum in some countries of the world for defining priorities in national needs and the role of science and technology in satisfying them. Though it is too early to say whether the country papers would constitute a coherent national science and technology policy for development, it was agreed that such papers would indeed have the potential of being translated into effective national plans. Some concern was expressed as to whether country papers would reflect the broadest participation of a country's citizens and its divergent constituencies. While some felt that many country papers would be documents thoroughly sanitized by their sponsoring governments, others were more hopeful in obtaining documents which reflected a significant and widespread participation. Particular concern was expressed that this should be the case with the United States country paper for which serious preparations have begun. It was also recognized that there should be scope for divergent points of view expressed through alternative national papers and an NGO Forum at the 1979 Conference.

### *Food, Poverty and Indigenous Scientific and Technological Capabilities*

The group devoted a good deal of its time to discussing universal mechanisms for meeting basic human needs. Due to limitations of time, only two issues-- food/poverty and indigenous scientific/technical infrastructures were reviewed in some depth. An examination of the issue of food/poverty indicated that the problem was quite complex and needed different mixes of approach in each particular local situation. For instance in some areas priority might have to be placed in increasing food production, in others in altering social structures and fostering institutional changes, and yet in some others by extending the benefits of an agricultural extension service. Furthermore solutions to these problems are bound to be affected by human endowments: in some parts of the world there is scarcity of capital but not of trained manpower, in others there is abundant capital but the skilled personnel are scarce, and in some others both capital and trained personnel are in short supply. It was, however, recognized that with external assistance, principally from the industrial nations within which the position of the United States was preeminent, the process of applying pertinent science and technology together with local political and social support for eliminating poverty might become easier.

Throughout our discussions there was unanimity on the importance of indigenous science and technology infrastructure in the process of development. It was agreed that during the last thirty years the miracles of modern science and technology have failed to adequately or appreciably change the economic status of masses of people in the developing countries.

Imported science and technology, in the absence of a well developed indigenous scientific and technological infrastructure, however massive it might be, has proved unable to trickle down the benefits of economic growth to the lower substrate of a developing nation. Many developing nations have made great economic strides in the last thirty years as measured by GNP, but such growth has in most cases neither decreased the level of poverty nor created conditions for the eradication of poverty in the near future.

For alleviation of poverty, it is necessary that the lowest strata of society have direct access to and input into the indigenous infrastructure of science and technology. Otherwise such structures will remain marginal to the social and economic development of the poor.

#### *The Nature of Debate on the Issues*

Serious and fundamental reservations as well as active support within the group were expressed regarding this proposition:

The U.S. should seek to encourage the transfer of those skills and knowledge designed to meet the basic needs of the poor majority in the Third World while ceasing to provide public subsidies and incentives for the flow of investments and technologies which have adverse consequences for meeting these needs, as well as for employment in the United States. The determination of these consequences should be based on joint identification by the United States and the recipient country of the social and economic costs and benefits to both countries. The United States should also work toward international agreement with other industrialized countries to take similar steps.

In the view of some of the group, the vigorous differences of view on this proposition make it a key issue of public policy in the emerging national debate on the future shape of U.S. relations with the world's poor majorities. But others in the group disagreed that this was the key issue, suggesting instead that the debate should focus on finding the best ways of making available relevant knowledge and skills to developing countries to help them solve their economic and social problems.

In the national debate that is being generated in preparation of the U.S. country paper for UNCTAD, we recognize a spectrum of differences on fundamental approaches. At one end of the spectrum, it is argued that technologies, however efficient, should not be transferred to the less developed countries unless they rapidly increase employment and have the potential of reducing social and economic disparities. It is further argued that the internal resources of a developing country and the external aid to it should be used primarily for the poor rural majorities and discouraging urbanization and development of an industrial structure imitative of the industrialized countries. On the other end of the spectrum, it is argued that rapid industrialization in which both heavy and light industries play an important role is the only viable strategy for development even though there may be in the initial phases of industrialization an increase in social and economic inequities within developing nations. One argues for primacy of social direction of growth, the other for a mix of social and economic objectives. In our group, the differences were not at the ends of the spectrum. They were more in degree than in kind and lay primarily in the choice of means and strategies for obtaining a rapid development of self-sustaining social and economic growth with equity through the utilization of appropriate science and technology. Some of these differences are reflected in the suggestions that follow:

#### *Suggestions for Action*

The group agreed that steps must be taken by the United States because of its preeminence in many fields of science and technology if a new international economic system being proposed by the United Nations is to become a reality. The ultimate goal of all these initiatives is to be the development and the strengthening of a self-sustaining indigenous capability in science and technology which has so far eluded most developing nations. Since this capability cannot be developed overnight, both short term and longer term initiatives are necessary. Furthermore, since the capability must be developed within the countries concerned and cannot be imposed externally, what the United States and other industrialized countries can do is limited.

Together with the United Nations, and its member states, both bilaterally and multilaterally we should seek the establishment of institutions and the development of mechanisms that would provide leadership in the application of science and technology to meet basic human needs while each nation seeks to develop its own indigenous self-sustaining capability in science and technology. There are ten suggestions among the many advanced by the members of the group. Considerable difference of opinion was expressed by members of the group about some of these. Their inclusion here should not be taken to imply consensus but rather is intended to indicate the range and variety of ideas expressed.

1. More effective mechanisms for making public sector technologies and scientific knowledge relevant to the needs of developing countries should be developed by the U.S. government, taking into account the experience of past efforts which have had only limited impact.

2. The recent steps taken by the Administration to be created within the Department of Energy and the Agency for International Development (AID) small funds for support of research and development (R and D) on alternative energy sources of special relevance to developing countries should be expanded in magnitude and extended to other basic human needs such as food, health, housing and education.

3. The United States should establish an Institute for Technological Development to respond to specific requests from developing countries for technologies. The Institute would function both as a clearinghouse and source for supporting further R and D where needed in the United States or elsewhere and in either the public or private sector.

4. An international clearinghouse for identification of "community technologies" coupled with mechanisms for problem identification at the local level within developing countries should be created.<sup>a</sup>

5. Regional technology development institutes should be established or strengthened where they already exist, under multilateral auspices but with active U.S. support.<sup>a</sup>

6. Mechanisms should be created or strengthened to stimulate more flow of light capital technologies among developing countries, looking toward the eventual emergence of common markets in major regions of the Third World.<sup>a</sup>

7. The United States should curtail its promotion of the export of capital-intensive technologies by requiring the Export-Import Bank and the Overseas Private Investment Corporation to concentrate their loans and investment guarantees on industrial projects in developing countries with low rates of investment per workplace.

8. Tax incentives and other inducements should be given to U.S. corporations which make a serious effort at transferring the skills which go with the capacity for creating and adapting technology to their industrial partners in poor countries, especially those working in socio-economic areas directly related to meeting basic human needs.

9. Substantial and sustained research needs to be mounted in the United States, other industrialized countries, and especially developing countries on agriculture, afforestation, diseases, and weather change and climate control distinctive to the tropical regions of the Earth. Because most of the world's R and D facilities are concentrated in temperate climates, relatively little basic and applied work has been done on these problems of the tropics.

10. Preparatory efforts for the 1979 U.N. Conference should be accompanied by a vigorous global consciousness raising effort to stress both the potential of science and technology in solving shared human problems and the complexities of utilizing them for constructive social purposes. Films, television, radio, and the print media should all be employed in this effort, which might be focused on a call for each member state of the United Nations to prepare and release for internal and external consumption three major productions in the form of films, television programs, or books on these themes before the 1979 Conference.

Uneven social and economic development in many countries, and social and economic stagnation in others, have created tensions both within and among nations that are not being contained within democratic and/or peaceful processes, and these tensions threaten to engulf nations and regions in conflict. Consequently a strategy for peace calls for bold initiatives, within the framework of cooperation with the world community, to hasten the process of social and economic development through a vigorous application of science and technology, even though science and technology by itself is unable to solve the world's socio-economic problems.

WAR CONTROL PLANNERS, INC.,  
Washington, D.C., December 7, 1977.

HON. ADLAI E. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, Senate Committee on Commerce, Science and Transportation, Washington, D.C.*

DEAR MR. CHAIRMAN: In appreciation for your initiative in holding Hearings on December 15, 1977 on U.S. Preparations for the 1979 United Nations Conference on Science and Technology for Development:

<sup>a</sup> Suggestions are not mutually exclusive. Some of the activities suggested herein are being carried out by existing institutions. We suggest that these institutions should be examined first to see if they can be strengthened before new institutions are created.

The following are purely personal background perspectives based on more than twenty years study, work, observation, speaking, writing and editing in the field of the generation-long Kremlin/White House science and technology and strategic power race, jointly with Harriet, my wife, until her death on June 17, 1977.

This upcoming U.N. Conference was established by the 21 December 1976 U.N. General Assembly Resolution 31/184. One of the guidelines for the Conference in this Resolution was taken directly from the earlier Economic and Social Council Resolution 2028 (LXI) paragraph 3, Section I as "Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries." The italic is mine, to the potential for the Conference which is far wider than its limited title suggests.)

It is dangerous to oversimplify approaching world crisis which is the most complex and difficult predicament humanity ever has faced, but it may enhance the evaluation of the testimony the Subcommittee will hear, if I may be permitted to make the following simplifications under headings:—

*The dangerous trap of immediate problems.*

*The historic pendulum swing in man's accumulating knowledge and skills.*

*What nation will provide world inspiration and leadership?*

*The ultimate personal responsibility of the president and members of Congress.*

*A U.S. grand strategy the American people can grasp and support.*

#### THE DANGEROUS TRAP OF IMMEDIATE PROBLEMS

Mentioned in sympathy and not in criticism, attempting to discuss this subject with persons in the Executive Branch and in the Congress is somewhat like trying to work with persons trapped in the hold of a burning, sinking vessel at sea, beating frantically at nearby flames with inadequate brooms . . . unable to focus attention on the question of building a fire-proof boat . . . or a crisis-proof world.

It may be difficult for overly busy Senators and their Staffs, and the Washington Press Corps, to refocus attention away from the immediate hot fires of world and domestic crisis, to bring into full view long-long range historic perspective of the opportunity afforded by U.S. participation in this world conference. Quite literally the choice may be whether humanity itself has a worthwhile future or a future of tragedy. A choice like this may never again be available.

#### THE HISTORIC PENDULUM SWING IN MAN'S ACCUMULATING KNOWLEDGE AND SKILLS

Advancing science and technology and management skills which made possible production of jet bombers to kill people at unprecedented magnitudes and distances, then made possible the *pendulum swing* in the opposite direction and production of jet transport planes, bringing people closer together into new world community.

Similarly, the generation-long Kremlin/White House science and technology and strategic power race, now producing the weapons capable of rupturing, or destroying, world civilization has reached the historic moment when a *pendulum swing* in the opposite direction is possible for the first time in history, and the next-generation research and development and demonstration of world-sized systems and institutions of a civilized world order capable of guarding the security and independence and progress of all nations, large and small (as Air Traffic Control guards the safety and progress of all airplanes flying blind in a cloud).

#### WHAT NATION WILL PROVIDE WORLD INSPIRATION AND LEADERSHIP IN THE NEXT GENERATION?

There are about 150 sovereign nations on the planet. The people of these nations have not attached their support to either Kremlin or White House side of the self-generating race to produce the weapons capable of obliterating humanity. Any political persons can understand this.

The nation which will emerge to inspire and lead the people of all nations will be the superpower with leadership vision and noble purpose capable of (1) meeting all requirements for its own defense and in addition (2) setting the pace for a next-generation competition in the development and testing of world-sized systems and management institutions and legal structures capable of guarding the national security of all nations, and releasing the scarce ener-

gies and resources of the Earth for production of food, clothing, housing, energy, clean air & water, health, education and wellbeing of the people of all nations.

The awesome task of pioneering systems to make Planet Earth safe for human futures will be an "impossible" challenge, as a generation ago it was an "impossible" challenge to make the Moon safe for human visits. The knowledge and skills are now available. Missing is the vision and the commitment.

#### THE ULTIMATE PERSONAL RESPONSIBILITY OF THE PRESIDENT AND MEMBERS OF CONGRESS

After the shock of Pearl Harbor President Roosevelt and Congress wielded U.S. strategic power on two quite different levels. (1) Responsibility for waging the war and crisis management was delegated to Theater Commanders, reporting personally to the President, and in addition (2) strategic councils were created reporting personally to the President to (a) envision the distant future situation where the clear and present danger to America would be brought to an end, and (b) release the creativity and power of America to develop and test the unprecedented capabilities to eventually achieve that strategic goal and overriding purpose.

Since World War II with the increasing potential for instant global catastrophe, all responsibilities for global crisis management and waging the world's hot and cold wars have tended to become concentrated in the White House and the Congress. Both organizations have become almost paralyzed by day-to-day problems, short range crises, sudden emergencies and unexpected historic events.

Nowhere is there a strategic council . . . separate from and in addition to the essential National Security Council . . . reporting personally to the President and to the American people through their Congress . . . charged with assisting the President in (a) envisioning the future world order within which the clear and present danger to America will be brought to an end, and (b) releasing the creativity and power and character of America for a next-generation commitment to develop and test . . . and invite all nations to cooperate or compete in developing and testing . . . world-sized systems and institutions for a community of nations within which people and nations will find security and progress, by guarding the security and progress of their enemies and their neighbors as for themselves in an unprecedented Golden Rule diplomacy.

#### A U.S. GRAND STRATEGY THE AMERICAN PEOPLE CAN GRASP AND SUPPORT

If the American people are to avert approaching tragedy and to lead the nations toward a worthwhile future . . . like a successful football coach the President (with the support of Congress) will have to create and maintain two different kinds of superior strategic power. He will have to maintain a superior defense power, to prevent opposing hostile powers from breaking through to their goal of world dominion. But a nation, or a football team, with nothing more than defense strategy, in time will lose the confrontation.

In addition, the President will have to develop and maintain a superior forward power, gradually to lead all confrontations down the field toward the distant goal of a civilized world order.

A large sector of America will be working in the defense platoons defending the United States against clear and present dangers from hostile foreign powers.

And in addition a large sector of America will be working in the forward platoons as the President and Congress release them for a new generation of research and development and experiment into the new historic era of world-sized systems and new institutions and unprecedented instrumentalities to assist the people and governments of ALL nations in the utilization of science and technology (knowledge and skills in all professions) in their struggles for security, and independence, and progress . . . the three "gut issues" for which the American people fought their Revolution two hundred years ago.

The U.S. all-out commitment to Science and Technology and Development in all nations can be made now by the President and Congress for more concrete demonstration in 1979.

There is an explosive, pent-up global compassionate power potential of creative American citizens in all professions and fields waiting for the Government to create the agencies and instrumentalities through which it is legitimate, and safe, to reach out to the rest of the world to help all nations . . . enemies and neighbors as ourselves . . . in learning how to utilize science and technology and management skills and accumulated knowledge in all fields to serve the needs

of humanity, as effectively in the coming generation as in the last generation we have led the world in the development of the global systems of destruction, death and devastation.

As suggested in the enclosed editorial from *Air Force Times* October 24, 1977 in addition to continuing mobilization for essential defense power the Pentagon itself can be mobilized to play a dominant role in the forward power within a New American Purpose leading the nations toward a future all-Nation security system and institutions, as all nations learn to utilize their own military institutions for development.

It is to be hoped that the hearings on December 15th will open the gates to a new historic era.

I attach the discussion agenda item "Scanning the Earth" published in December 1978 "Spectrum," journal of the Institute of Electrical and Electronic Engineers—IEEE—merely as one concrete example of the explosive creative power of America waiting to be released by the President and the Congress.

HOWARD G. KURTZ,  
*President, War Control Planners, Inc.*

[From the *Air Force Times*, Oct. 24, 1977]

### TIME TO GIVE MILITARY DUE CREDIT

(By Bruce Callander)

What the military services need, some of the critics contend, is a peacetime mission which will:

Excite the country's best young people to the point where they will flock to the colors.

Convince the taxpayers that every penny of their defense money is going to a useful, constructive purpose.

Give career military people such a sense of importance and such a feeling of being appreciated that they will consider the pay and benefits only secondary.

Dispell the image of the armed forces as paid killers and replace it with one in which they are viewed as humanitarians in uniform.

The ad agency which could concoct that kind of corporate image for the services probably could write its own ticket.

Unhappily—or happily, depending on your point of view—Madison Avenue probably isn't up to it.

The Vietnam war did not make the services the most popular institution in town. The rising cost of defense hasn't helped. Concern over serious domestic problems has put day-to-day survival ahead of long-range survival in the minds of many people.

The military probably enjoys greater public approval than it did during the Vietnam war or in past times of peace, but that is not saying a lot. Long before Kipling put the sentiment in verse, people were saying that a soldier with no war to fight is about as welcome among his fellow citizens as a case of liver.

In wartime—at least when there is general public support for the war cause—the situation is different. But it is not necessarily the professional soldier who is honored. Often as not, it is the short-time volunteer or the conscript, who may not have wanted to be part of it at all. A general mobilization involves enough people so that most of those who aren't in have a close friend or relative who is. It's hard to be negative when a loved one is giving his all.

In peacetime, the prime excuse for an armed military establishment is the threat of war. People may accept the need for protection and pay for it, but they don't necessarily like it. An insurance policy may be recognized as one of life's necessities. It may give the insured a degree of comfort and well being. But he doesn't have to like paying the premiums.

But what if the military became a profitmaking organization—not in the sense of making money but in the sense of providing a host of useful services valuable and visible to the ordinary citizen in his daily life?

There are, of course, countless examples in which this happens.

A natural disaster strikes an area. With the Red Cross and the local emergency units, the National Guard comes to the rescue. The active forces supply airlift, helicopter evacuation, medical help, bulldozers and whatever.

Or volunteers from a nearby installation restore an orphanage or adopt the residents of an old folks home.

Or a child with a rare disease is airlifted to a military hospital and provided a crewman's pressure suit.

Or a technique learned through military research is used to solve a farming problem or improve a consumer product.

In isolated ways—many of them invisible to most of the public—the military investment is turned back to the taxpayer.

Unfortunately, much of the time, the services get little credit for their contributions. Sometimes they are taken for granted. Other times, there is a conscious decision to keep the military involvement in low profile.

The U.S. space program has been one of the prime examples and, in many ways, the most unfortunate one.

From its beginning, the program has been a close military-civilian partnership. Early boosters were modified intercontinental ballistic missiles. The launch sites have been military real estate. Most of the astronauts have been military fliers and those who were not have been trained by the services. The Air Force has supplied the civilian space program much of its top talent. Army has provided worldwide communications. Whole fleets of Navy ships have patrolled the recovery areas.

Yet "on-camera," the space shots have appeared as almost completely civilian shows. The military astronauts rarely appear in uniform. Seldom are they addressed by military rank. The logo on space hardware—even that supplied by the military—seldom is that of the parent service.

Why? Because, from its onset, the U.S. space program was advertised as a non-military endeavor. The aim was to show that, in contrast to the unblushingly military Soviet space effort, the U.S. activity was concerned solely with the peaceful exploration of space.

Whether that attempt was completely successful is a question. It did accomplish one thing, however, and that, presumably, was unintentional.

By the obvious effort to remove the military "taint" from the program, the government was helped to perpetuate the popular belief that the services' expertise lies solely in the field of war making.

That belief has been encouraged further by the effort to justify the space budget. Much has been made of the "spin-off" benefits consumers have enjoyed from the civilian space programs—from no-stick cookware to clearer TV pictures to nourishing fruit drinks. Little if any effort has been made to publicize the contributions which originated with the military.

We have not always been so shy about the military's involvement outside the profession of arms. In the 1920s, military fliers, often in military planes, flew in civilian air races and often won. In the 1930s, the Army's Corps of Engineers built some of the world's largest dams. In the immediate post-WW-II years, commercial aviation still admitted that most of its pilots had military backgrounds and that many of its planes were descendants of service aircraft—the Boeing 707 from the AF's KC-135, for example. Now the military connection often is ignored or at least underplayed.

All of which is not to say that things have changed completely. Lost campers still are happy to be spotted by the AF's Aerospace Rescue and Recovery Service. The Engineer Corps still has its hand in numerous public works projects. All services still turn out to help their civilian neighbors dig out of a snowstorm or recover from a flood.

But there are scattered efforts which, however numerous and important, can be looked on as the exception rather than the rule. There is nothing in the military mission which addresses the relationship of peacetime forces to the civilian community beyond that of peacekeeping and preparedness.

Perhaps it is ridiculous to think of the defense manpower, equipment and expertise as a national resource available for other than deterrence and battle.

But consider the magnitude of those resources—the planes, the ships, the heavy vehicles, the tools, the repair facilities, the laboratories, the buildings and real estate. Consider the number of doctors, dentists, policemen, mechanics, computer specialists, educators, lawyers, pilots, seamen, engineers, accountants, clerical workers, personnel experts, space technicians, electronics workers, musicians and firemen the services have produced.

One way and another many of these resources are brought to bear on problems of the national community. But the services rarely receive full credit for their contributions.



What if some way were found to make it a principle of national policy to use all of the resources of the armed forces for the betterment of the nation and the world in ways which would not compromise the nation's defense or reduce readiness?

A group called the War Control Planners—the non-militant peace group which has been discussed in these pages from time to time—suggests a way. They propose a world effort using space technology and other capabilities to locate new energy sources and mineral deposits, improve agriculture, detect natural disasters in the making, forecast and control weather and enhance world communications.

Each nation could participate in such a program by investing some of its military resources, the War Control Planners contend, but without giving up any of its defense capabilities.

The services already participate to a degree in such ventures, but there is a certain sense of national embarrassment about such participation and the military involvement is played low key.

Perhaps it is time to bring the military out of the closet, recognize it as something other than a necessary evil and restore national pride in its existence. Not needed? Consider this tiny bit of evidence: Do you really believe that the reason young military people resent service haircut regulations is that they dislike not being able to effect contemporary styles? Or is it a deeper problem of being marked as a member of an organization with which they are not anxious to be so prominently identified?

[Excerpt From Testimony by Harriet and Howard Kurtz]

For world-wide pro and con and creative discussion—

#### ONE CONCRETE EXAMPLE OF AVAILABLE PRO-HUMAN STRATEGIC RESEARCH AND DEVELOPMENT ACTIVITIES

To stimulate creative professional discussion, the December 1973 issue of *SPECTRUM*, journal of the 160,000 member International Institute of Electrical and Electronic Engineers—IEEE—published the following projection for a large scale, long range, sustained commitment for expanded programs of military and civilian earth-serving intelligence and communications satellites . . . an expansion of President Eisenhower's "Open Skies" policy now magnified a thousand times by advancing global science, technology and management skills:

#### SCANNING THE EARTH

CAN ELECTRONICS MAKE A BREAKTHROUGH FOR PEACE USING SATELLITE-DERIVED DATA? THE TECHNOLOGY IS AT HAND

#### *Proposal for a global information cooperative*

The American people through their government could announce to the world a large scale, long-range, sustained commitment to build a giant open-to-the-public Global Information Cooperative . . . linked to a greatly expanded ten year series of earth-orbiting, intelligence-gathering satellites and other global information-gathering sources. The objective of this Global Information Cooperative would be:

I. To maintain a public inventory of potential public danger for the planet, whether from threat of war, or pollution, or drought, or hurricane, or blight, or shipwreck, or any other threat to the general wellbeing of human beings everywhere, and

II. To provide earth resources development information assisting the economic progress and human wellbeing for people of all nations. All nations will be invited to cooperate as part of an eventual broader War Prevention Decade of new research and development and testing.

All nations would be invited to cooperate by assigning experts and research teams to work together in a large Global Information Research Park surrounding the Cooperative. This would include military experts, intelligence experts, agricultural experts, geologic survey experts, and specialists in all relevant fields. There would be no classified information, no secrets. Anything that can be seen or detected or discovered through outerspace instrumentation would be available to the people and the nations of the world.

Information would be made public on large illuminated information display walls, and would be stored in computers for reference. Communications links would be maintained with the world radio, television, and printed news and public information media. This mobilization of information research and development for the future safety and wellbeing of the people of all nations would proceed with American initiative, no matter what nations withhold cooperation at first. Nations would be free to join the cooperative at any future time.

There would be no need to first "negotiate" with potential enemies before the American people lead the people of all nations gradually toward a new age of openness. Potential enemies on both sides of all confrontations would be invited to see inside their own country what American reconnaissance satellites already see.

All nations capable of launching surveillance satellites would be invited to link them to the Global Information Cooperative. All nations would be invited to build similar open-to-the-public information centers, linked to central information receivers, and storage facilities, and retrieval facilities. All nations would be free to install receiving facilities to be linked directly to the eyes-in-the-sky.

HOWARD AND HARRIET KURTZ,  
*War Control Planners, Inc., Box 19127, Washington, D.C. 20036.*

Howard G. Kurtz spent twenty-two years (1932-1954) in airline management positions and twelve years (1954-1966) in the management consulting firm of Handy Associates, Inc. Since 1966 he has devoted his full-time to War Control Planners, Inc., of which he is president.

Harriet B. Kurtz graduated from Wellesley College in 1937, and Union Theological Seminary in 1962. She was ordained to the ministry of the United Church of Christ in 1964, with a mission in the field of war and crisis as her particular charge.

[From the New York Post, Friday, May 27, 1977]

## PEACE VIA THE GOLDEN RULE

(By William Greider)

If you are sincerely sick of the nuclear arms debate, if your mind is thoroughly bogged by the confusion of rocket stockpiles and hard-target kill ratios and throw-weight projections, if you are totally doped out by the diplomatic thunder between Washington and Moscow, here is a sweet idea to consider instead.

Here is what Harriet and Howard Kurtz are selling as their alternative to the arms race. This is what they would tell the President if they could ever get in to see him:

Mr. President, the Golden Rule is whirling around out there in space—all you have to do is grab hold of it. Change the world. Open a new epoch. Save mankind from its own worst impulses.

They are as patient as unhonored prophets. For 20 years they have been pushing their idea; sending out reams of letters and bulletins, carefully typed with the key thoughts underlined in red; calling on scores of government officials with their homemade slide-show briefing; talking to countless editors and reporters.

Meantime the world's nuclear arsenals have doubled and tripled, and the capacity for mass destruction is spreading to additional governments.

Harriet and Howard are in their 60s. She has cancer (or she had it until the operation; the prognosis is good). Five years ago they sold their home in upstate New York and moved their War Control Planners Inc. to a ninth-floor apartment in Washington. They are deeply in debt and living on his Social Security.

They began promoting the Golden Rule in the sky in the early 1960s as "War Safety Control."

The Kurtzes propose that the President create and promote a "global information cooperative" that would plug every nation of the world into the system, friend and foe alike, sharing not only the commercial-environmental benefits, but eventually the military intelligence which is Top Secret.

That's the point where a lot of people throw the Kurtzes' material into the wastebasket. Undaunted, Harriet and Howard argue that the idea makes sense, not just morally, but militarily.

She is an ordained minister of the United Church of Christ, commissioned in 1964 to follow an independent mission for peace. He is a former lieutenant Colonel in the Air Force, an engineer.

They got into this crusade a generation ago in the strangest way. After World War II, Howard was working for American Airlines planning for the first New York-to-Moscow air service. The CAB granted a license in 1946.

The Cold War intervened. Howard was in Moscow on May Day of 1947 and saw the new Soviet weaponry on display there. "I could see the next war beginning," he said. "We could see our two babies being caught in it."

#### HOPEFUL PROPOSALS

So they became permanent amateur students of global politics. In the 1950s they held regular roundtables on the subject, collecting ideas, drafting hopeful proposals.

Their children, as teenagers, used to bring home friends to join the discussion. Today they are grown (Brenda is an actress in New York; Bryan is a banker in Chicago) and still encourage their parents.

In 1965 Howard lost his job with a management consulting firm. He attributes this to pressure from two defense manufacturers who were clients.

Since then they have both done peacemaking fulltime. They mail out their newsletter, Checkpoint, to a network of about 3000 friends and supporters, some of whom respond with occasional contributions.

Between the preacher wife and the engineer husband, the basic technique of War Control Planners Inc. is to take the latest marvels of war and space technology and try to imagine how this same hardware might be used to assist in global peacekeeping.

Back in 1961, for example, the Kurtzes sent a far-out package to the new President, proposing an "all-nation declaration of independence" and suggesting how the U.S. might use modern electronics to help all nations protect their borders.

Some of the same techniques—electronic sensors as sentinels—showed up in Vietnam a few years later as the famous "electronic battlefield." Something similar is now being proposed as an element in the Middle East peacemaking.

Ten years ago, they shifted their tactics somewhat, talking up the non-military possibilities of the satellite systems that were then emerging, urging that they be organized on a broad global basis.

Their theory is that once hostile nations begin sharing the fruits of weather-geological-agricultural information, the benefits of sharing military intelligence will become obvious.

The potential benefits, for peace or for profit, are still unknown but easy to imagine.

One NASA-Dept. of Agriculture experimental satellite, for example, is able to identify 17 different crops from 570 miles up. It can determine whether the crops are seedlings or mature, healthy or blighted, well watered or parched.

The Kurtzes propose a CAIA (Central Agricultural Intelligence Agency) without secrecy—and without having to ask the Soviet Union whether it approves.

The sharing of military data will also seem more plausible in time, the Kurtzes insist, when Americans begin to understand that the Defense Dept. can no longer defend us.

President Carter's new director of the White House Office of Science and Technology, Frank Press, recently sent the Kurtzes a cordial response, assuring them that scientists generally share their broad goals and urging them to be patient with the constraints of experimentation.

Sometimes, Howard says, "we feel like the people who spent years building a boat in the basement, only to find there was no door big enough to let it out."

Harriett says, "If we have a contribution to make, it's likely to be a very small but a very crucial one. That's what we tell ourselves when we're trying to keep afloat. I don't know whether that's right or not."

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#### STATEMENT OF SUSAN KOKINDA, LEGISLATIVE REPRESENTATIVE, U.S. LABOR PARTY

Too often, the subject of technology transfer to the Less Developed Countries is approached, as is the case with the AFL-CIO, as a give-away of jobs or know-how or whatever on the part of and to the detriment of the United States.

It is imperative that the United States representatives deal with and dispell this dangerous and inflammatory misapprehension prior to the preparation of the U.S. position paper. In reality, nothing could be further from the truth. The U.S., its industry and its labor force are as much recipients of the benefits of technology transfer and capital intensive development to the LDC's as are the actual recipients themselves. A quick look at the continuing collapse of the U.S. dollar provides the easiest refrant to the point.

Much noise has erupted over the alleged need to cut U.S. oil imports to save the dollar. This "solution" of forced conservation of energy not only misses the point entirely, but will only serve to weaken the dollar further through the deleterious effects of slowing energy-usage growth on U.S. industry. The base-line weakness of the dollar stems from two points. First, various financial forces centered in the City of London are committed to a campaign of financial warfare against the U.S. dollar and our economy. That in itself would be laughable, as a side-ways glance at the British economy indicates, except for the very real underlying weakness of the U.S. dollar—a weakness brought about by collapsing U.S. (and OECD) exports to the Third World. As any detailed analysis of balance of trade figures over the last several quarters will show, it is collapsing capital goods exports to the Third World, and not increasing U.S. oil imports, which accounts for the underlying weakness of the dollar and its susceptibility to British inspired manipulation.

One does not need to look far for the cause of Third World import collapse. According to Bank for International Settlement figures, well over 90 percent of new commercial credit issuances to the LDC's in the second quarter in 1977 went to debt repayment. Couple that lack of credit for internal development with IMF austerity demands for import cutbacks in the LDC's and you have the result of a spiralling collapse of Third World markets and a 9 percent dropoff in OECD exports in the third quarter in 1977. The effect of this is already clearly manifest in the U.S. steel industry, where the shut-down of Third World markets for capital goods has resulted in a diminution of world-wide demand for steel. It is these markets which must be opened up again to the dual end of benefitting the populations of the developing countries and reestablishing the U.S. dollar as a stable, hard-commodity-based currency.

The relationship between the U.S. ability to export advanced technology and the strength of the dollar was underlined most forcefully in a recent statement by Venezuelan President Carlos Andres Perez, who reaffirmed Venezuela's backing for the dollar stating that the dollar was based on the most technologically advanced economy of the world. Perez stressed that it was the research and development strength of the U.S. which made the dollar a valuable currency to the Third World.

To reaffirm that relationship between the dollar and advanced technology export, two complementary policies must be stressed. The first, the upgrading of the Exim Bank for the provision of credit flows for hard commodity imports to the Third World, is appropriately detailed in other Labor Party documents and is not the immediate subject of discussion. The second, of course, is the actual content of technology transfers to the Third World. The following discussion is a recommendation as to the content of the U.S. position, a content which should reject both the dangerous demands of the AFL-CIO leadership and the "appropriate" or "soft" technology advocates.

#### WHAT IS DEVELOPMENT: THE AMERICAN EXPERIENCE APPLIED TO THE MIDEAST

Several of the witnesses who testified before the Subcommittee questioned whether we could or should assert with any assurity what the development process actually is and what role the transfer of advanced technology plays in that process. The process is no mystery. One need only look to the thinking and writing emanating from a certain new nation, which had just thrown off its colonial status and embarked upon "the development process" to find a rigorous, and subsequently proven successful, definition of that process. The nation was the United States and one of the seminal documents was Alexander Hamilton's Report on the Subject of Manufactures which defines the key to the development process in the notion of "the productive powers of labor." In short, Hamilton declares that the wealth of a nation lies in the skill and creativity of its workforce; that is, in the ability of its workforce to develop and apply new arrays of capital-intensive technologies. That necessarily implies an increasing standard of material and cultural living for the population as a whole to be able to rapidly assimilate those new technologies and processes.

The application of this notion of augmenting the productive powers of labor through capital intensive industrialization to the Third World can be most readily illustrated in the case of the Mideast. A Memorandum prepared by the Fusion Energy Foundation (Appendix A), identifies the necessary points:

"The core of the essential industrialization of the region is Egypt. This country has the combination of a large, concentrated and semi-skilled population and a large intelligentsia to lead the entire region onto a path to modernization. A program of Egyptian industrialization is thus the key to the Mideast problem.

"The 'commonsense approach' to Egypt, which views the country as the 'poor relation' of the oil-rich Arabs must be turned around. Egypt must become the economic leadership of the region, the model of the transition from dependency on oil to industrial growth. Contrary to the programs of the IMF, the future of Egypt lies not in its agriculture, which is relatively limited in its potential, but in its industry and population. Once a process of Egyptian industrialization and urbanization is undertaken in the context of general regional development, the redirection of all the economies of the Mideast will become possible."

The memorandum illustrates in detail a process of massive technology and capital transfers to Egypt and the region, ranging from the development of a nuclear power grid, through industrialization and urbanization, and the mechanization of agriculture, which by 1990 can achieve thorough industrialization of the Mideast region. (Only implicit in the Memorandum is the obvious necessity for a peace settlement in the region, in part to free up the Israeli skilled workforce, and the necessity for debt moratorium for both Egypt and Israel to allow for the enormous capital imports.)

This high technology approach, applied many times over in other regions such as the Rio de la Plata and the Ganges-Brahma-Putra Basin, is the only possible way to lift the Third World out of poverty and misery. To such "appropriate" technology advocates as Rep. Clarence Long (D, Md.) who claim that "the Third World doesn't want nuclear power, they have plenty of sun and animal waste," one need only note that India, Iran, Egypt, Brazil, etc. have been adamant in their demand for nuclear technology and rather less than adamant in their demands for imports of solar heaters and biomass converters. To be as brief and as blunt as possible, the "let-them-live-in-dung-huts" crowd functions as the ideological cover for continuing the looting policies of the IMF and World Bank and their London and New York financial allies. The charge of "technological imperialism" raised against the Carter Administration's nuclear nonproliferation policies bears more than a literary relationship to the colonial looting policies of British imperialism. And there is no other word than "racist" to describe those who claim that the Third World populations cannot experience the same marvelous transformation which our own population experienced in the first decades of our Nation's existence.

#### OUI BUONO?

It is recommended that the U.S. position at the U.N. Conference be grounded in the notion of replicating for the LDC's the "development process" as the United States itself experience it through the most rapid transfer of advanced technology and complementary capital inputs. Clearly this is the only route for the Third World and is critical to the maintenance of the U.S. dollar. As for the AFL-CIO leadership's complaint of loss of jobs, the protectionist upsurge which preceded the last depression should be sufficient to dispense with George Meany's folly.

But more fundamentally, the industrialization of the Third World opens up a demand for capital goods for the advanced sector which will put millions of Americans back to work in high-skill, high-pay jobs. As the accompanying article (Appendix B) demonstrates, the potential U.S. share of the nuclear export market alone over the next 10 years could yield 2,180,000 man-years of jobs in the best paying and most skilled fields. Couple that with the transfer of advanced agricultural technology to the LDC's and translate the resulting demand for tractors and fertilizer into U.S. jobs. Is there any question as to what kind of jobs American workers will choose when given a choice between those jobs and the pathetic demands for make-work public service jobs which dominated the recent AFL-CIO convention?

The orientation of the United States must be clear: to facilitate the most rapid transfer of the most advanced, hard technology—centering on nuclear and mechanized agricultural technology—and removing any financial, political or procedural barriers which stand in the way.

## APPENDIX A

[By the New York Fusion Energy Foundation, Nov. 30, 1977]

## TOWARDS A DEVELOPMENT-BASED MIDEAST PEACE

There can be no lasting peace in the Middle East and no resolution of global shortages of oil and gas without a concerted development program for the entire region. The countries of the Mideast must be provided with industrial economies which will ensure their prosperity after oil and gas reserves have been depleted.

The broader context for such development is the necessary global transition to an economy based on thermonuclear fusion beginning in the early 1990s. The development of this technology will ensure supplies of cheap and abundant into the indefinite future. During the transition period the most rapid development of existing and advanced fission energy technologies must be undertaken to pave the way for fusion and to replace rapidly exploited reserves of oil and gas.

The fundamental aim of a competent Mideast region development plan is the thorough industrialization of the region by 1990--by which time the first commercial fusion reactors should be coming on-line--with the laying of the foundations of that industrialization by 1985. This foundation-laying and industrialization must occur simultaneously with the maximum expansion of oil and gas production, and the modernization of agriculture and infrastructure in the area.

The core of the essential industrialization of the region is Egypt. This country has the combination of a large, concentrated and semiskilled population and a large intelligentsia to lead the entire region onto a path of modernization. A program of Egyptian industrialization is thus the key to the Mideast problem.

The "commonsense" approach to Egypt, which views the country as the "poor relation" of the oil-rich Arabs must be turned on its head. Egypt must become the economic leadership of the region, the model of the transition from dependency on oil to industrial growth. Contrary to the programs of the International Monetary Fund, the future of Egypt lies not in its agriculture, which is relatively limited in potential, but in its industry and population. Once a process of Egyptian industrialization and urbanization is underway in the context of general regional development, the redirection of all the economies of the Mideast will become possible.

Based on the industrialization of an Egyptian core area, secondary industrial development centers must be set up throughout the region. Of primary and immediate political importance is the establishment of a viable industrial center in the Palestinian West Bank area, the only possible basis for an independent Palestinian state. Additional secondary centers must be built up in Iraq, Algeria, and Iran, with limited but important development of petrochemical industries in the Saudi peninsula states.

Within the agreed-upon framework of such a general development program, immediate major projects could be initiated:

1. Energy development based on simultaneous vast expansion of oil and natural gas production and export, more than quadrupling current energy output by 1985, and establishment of an increasingly nuclear-based regional electric grid. This will involve the increase in electric power by more than 30 percent annually and the construction by 1985 of at least 50 nuclear plants in the region and a total production of 165 gigawatts of electricity.

2. The establishment of Alexandria and Cairo as the dual center of regional light and heavy industry through the development of a complex capable (by 1985) of the annual production of 2 million units of prefabricated housing, 100 million tons of concrete, and 20 million tons of steel, as well as heavy petrochemical production.

3. The utilization of advanced desalination techniques to massively and rapidly develop the agricultural potential of the Fertile Crescent and North African through fertilization and mechanization, aiming at the production of 200 million tons of grain by 1985. The initiation of longer term development of the vast fertile Sudan region through control of Nile water, leading to production of more than 1 billion tons of grain by the early 1990s.

4. The construction of major railroad links between Egypt, the Fertile Crescent, and the Persian Gulf region.

The establishment of Egyptian industrial complexes will act as the engine and hub of the general regional development programs. With a lessening of political tensions in the region, increasing trade with Israel will allow that nation's high-technology capabilities to greatly accelerate Arab technical development. By 1990, the backward nations of the Mideast will be completely replaced with modern industrial states.

We briefly outline here the major aspects of such a regional development plan: energy exports, industrial development, agricultural modernization, and infrastructural projects.

#### GOAL I: EXPANSION OF OIL AND GAS EXPLOITATION AND EXPORT

According to highly conservative estimates, the Mideastern and North African oil and gas-producing states are currently utilizing their resources at no more than *one-sixth* of the technically achievable output. Current oil production is approximately 25 million barrels per day (mbd) as compared to a potential of at least 115 mbd. Natural gas production is now limited to the energy equivalent and possibly far higher—perhaps as high as oil production itself.

With a determined effort in drilling and pipeline and port development, oil production in the region could be quadrupled by 1985, causing a 20 percent annual increase in regional oil export. Production could be increased to 85 mbd in Saudi Arabia, 15 mbd in Kuwait, 18 mbd in Iran, 10 mbd in Iraq, and 100 mbd for the Mideast and North Africa as a whole.

Natural gas exploitation can be begun with a program of largescale pipeline construction. The principal areas of attention should be the development of a very largescale underwater pipeline system to connect Algeria's 11 mbd (equivalent) supply with West European industry via the already surveyed link to Sicily; construction of long-distance overland pipelines to link Iran's 18 mbd production with rapidly developing demand on the Indian subcontinent; construction of an overland pipeline network to connect Abu Dhabi's more than 10 mbd potential with demand throughout the Mideast and neighboring parts of Africa.

#### GOAL II: INDUSTRIALIZATION AND URBANIZATION

A huge program of industrialization and urban development must be initiated at once, along with an agricultural modernization program which will free 80 percent of the population of Egypt, Iran, Iraq, and other countries from agriculture by the late 1980s. With adequate investment, the apparent "overpopulation" of Egypt and other countries will be seen realistically as a labor *shortage* based on insufficient skill levels.

Egypt must be the hub of regional industrialization. Egypt possesses a relatively well-educated and numerous population, and has in its million-man bureaucracy the untapped technical and literate manpower needed to initiate an industrialization program. The opening up of trade relations with Israel will naturally facilitate this industrialization process. Israel's principal role in regional development, to the extent that trade relations become politically possible, will be as a regional supplier of high technology goods and, eventually, the skills of the Israeli population.

The focus of Egyptian industrialization, which will serve as a model for Iran, Iraq, Algeria, and elsewhere, will be on industries supplying the urbanization process itself, and secondarily, the modernization of agriculture, including the expansion of the fertilizer industry.

The most immediate problem to be solved for both industrialization and urban development is the alleviation of the housing shortage in Egypt. To resolve this problem without resort to wasteful, labor-intensive methods, a large-scale prefabricated wooden housing industry must be established in Egypt, utilizing timber imported from the Caspian Sea, Turkey, Iran, and Iraq. These regions, well managed and scientifically developed are capable by 1981 of supplying 12 billion board feet a year, enough for a housing industry producing more than two million housing units a year. Such production, in an industry requiring only intermediate skill levels, will break the Egyptian housing shortage by 1985 and become a multi-billion dollar export industry for the rest of the region.

While developing this light, construction-oriented industry for the immediate term, major investments must be made in the more permanent urban infrastructure materials—cement and steel. Egyptian cement production, using regional natural gas supplies, is now at 6.5 million tons. Since this industry needs relatively little labor and uses abundant natural gas, extremely rapid rates of devel-

opment are practical leading to a growing supply for permanent solutions to the housing crisis, for urban infrastructural works, road building and export. Growth rates as high as 40 percent a year are fully feasible, resulting in output of 400 million tons per year by 1985.

Steel production, involving far larger plants imported raw materials, and far greater labor supplies will not develop as rapidly—nor will steel demand. However, increased production from the present annual two million tons to nearly 20 million tons by 1985 (making Egypt's per capita steel production equal to present U.S. levels) is entirely feasible.

The third major industrial complex to develop is, of course, in petrochemicals, especially the synthetic fiber industry to feed the already developed and expanded Egyptian textile and clothing industries. By 1985, these complexes should be providing all the clothing needs of Egypt and considerable regional exports.

This industrial development, accompanied by large-scale urban construction, will naturally necessitate a massive increase in urban employment. The prefabricated housing industry will absorb more than 500,000 workers by 1985; the cement and cement products industry, more than 400,000; steel, more than 200,000; petrochemical, textiles, clothing and other manufacture, more than 700,000. A total of over two million workers will be required in manufacturing industry as a whole. Construction will require another two million workers; transportation, essential services, and auxiliary workers, an additional two million. Considering that one million or more workers will still be required in agriculture and more than one million on teaching and other professions, we see the total absorption of the male adult population and the integration of women into the workforce. This last trend will be pronounced because of the necessary immense adult education program which must be undertaken and the resulting necessity for reduction of work hours for the individual.

#### GOAL III: MODERNIZATION OF AGRICULTURE

Despite the backward character of Mideast agriculture at present, and the region's adverse climate, the region has very large agricultural potential which can be relatively rapidly developed. There are three principal agricultural development areas within the region: the Fertile Crescent of Syria, Iraq, and Iran which contains 17 million hectares of arable land; the North African region of the Algerian-Tunisian and Moroccan coast, with another 17 million hectares; and the smaller Nile Valley of Egypt with 3 million hectares. Over the longer term, the Upper Nile Valley in the Sudan can provide even larger yields through the irrigation of more than 80 million hectares of land.

The key to the development of the relatively arid Fertile Crescent and North African regions is the use of advanced desalination processes which can provide the breakthrough to production of cheap water for irrigation. The recently developed Atomization Desalination Process opens up the possibility of desalination for 20 cents or less per thousand gallons. Such a supply of cheap water can completely redefine the possibilities for development of the arid lands of the Mideast, and make possible relatively rapid modernization of agriculture.

The principal needs in the Fertile Crescent and North African region other than scant, irrigated land could be expanded from 9 million to 16 million hectares by 1985 through the use of advanced desalination techniques, and the largescale salinity problem of Iraq reversed. Over a similar period, North Africa irrigation could be expanded in the coastal regions from less than 10 percent to more than 90 percent of arable land. A total desalination capacity of 7,000 cubic meters per second, mostly in the form of floating desalination plants, will be needed in the Fertile Crescent, and some 10,000 cubic meters per second in the North Africa coast region. The use of the Euphrates River for primary distribution and modern, center-pivot sprinklers for secondary distribution will limit major construction to the building of drainage tilting.

Ammonia fertilizer production using the local supplies of natural gas, and phosphate fertilizer, using local phosphate rocks, must be grossly expanded, again with the use of floating plants (which can now be constructed in less than two months.) At present, fertilizer use is negligible except in Iran where some 4 million tons are used annually. Combined nitrogenous and phosphate fertilizer production will have to increase to over three million tons year year by 1985 in each of the major agricultural zones.

Mechanization is equally essential to free the peasantry for integration into industry during the transitional period. Present numbers of tractors



Crescent (40,000) and North Africa (70,000) will have to be raised through importation to 200,000 in each area by 1985. These tractors must be accompanied by equal numbers of trucks and associated machinery.

These steps will increase grain production in the Fertile Crescent and North African regions to well above 100 million tons a year for each region, assuming double cropping. This is sufficient food for the entire region and for export.

Egyptian agriculture constitutes a special case. The limited but very fertile Nile Valley should be producing food at a far higher pace than at present. Increased fertilization and mechanization are essential, the latter to eliminate grossly inefficient labor-intensive methods. By 1985, Egyptian fertilizer production should at least double (to one million tons a year) and the tractor supply should double (to 40,000). However, the main problem is in water control. A largescale construction program, centering on the Delta and the lower Nile, must be immediately initiated to control irrigation and drainage of the Aswan-regulated Nile water. Such a program could, within five years, reverse waterlogging in the Delta and increase food production to approximately 20 million tons (from less than 8 million today), making Egypt virtually self-sufficient.

The Sudan holds even greater development potential than the arid lands to the North. It has abundant water supplied in the Upper Nile River, most of which are now wasted in the huge Sudd swamps in the south of the country. With largescale drainage canals, such as the long-proposed Jongelal canal, the Sudd could be drained and brought under intensive cultivation, creating 15 million hectares of land.

Over a longer period of time, the entire fertile areas of the Sudan, more than 80 million hectares of top quality land, could be irrigated with water from the Nile River. Such a project will involve massive development of the now almost nonexistent infrastructure of the Sudan, large-scale engineering and, eventually the importation of skilled agricultural labor and technicians from other countries, such as Egypt.

While the Sudan project will unquestionably take considerably longer than the Fertile Crescent or North African programs, additional production of up to 100 million tons of grain could be expected from this region by the late 1980s and with full production, by the early 1990s the Sudan could be the breadbasket of a quarter of the world, producing nearly 1 billion tons of grain a year (the equal of current world grain production).

#### GOAL IV: INFRASTRUCTURE

For these large-scale agricultural, industrial and urban development programs, the present rudimentary energy and transportation in infrastructure of the region must be vastly and rapidly upgraded. By 1985, agricultural electricity demand, mainly for desalination, will exceed 25 thousand megawatts, and demand for industrial and urban needs will be above 120 thousand megawatts—a total of 103 thousand megawatts. Egypt alone will require in excess of 40 thousand megawatts, in comparison with less than three thousand megawatts at present, necessitating an annual growth rate of more than 30 percent. Notably, Iran has *already* achieved a growth rate in electric generation of 35 percent per year.

The majority of this electricity will be supplied by gas-fueled generators, taking advantage of the abundant local supplies as much as possible. However, it is imperative that a growing proportion of total energy be supplied by nuclear power in anticipation of and in preparation for the transition to fusion beginning in the late 1980s or early 1990s. By 1985, near one-third of the total electricity in the region, or about 50 thousand megawatts, should be supplied by nuclear power. Egypt alone should, by that time, be operating at least a dozen, thousand megawatt nuclear plants. The construction of such plants can be accelerated by the application of the techniques of floating nuclear plant mass production of the type pioneered at the Soviet Atomash facility.

The necessity for transport infrastructure construction is equally urgent. Major rail links binding the Fertile Crescent region with both Egypt and Mediterranean and Persian Gulf ports—and a corresponding road network—are the most urgent priorities.

The infrastructural program will be chronologically the earliest, due to the long lead times involved in infrastructural development. But, with prompt decisions on the development program as a whole, the Mideast can be brought to European or better standards of industrialization, urbanization, and infrastructure by 1985.

## APPENDIX B

## ANTI-NUKE BILL WILL COST 2 MILLION JOBS

(By W. Engdahl and P. Arnest)

DEC. 27 (NSIPS)—The Carter Administration's ongoing war against nuclear power exports is threatening to cost this country's economy more than 2 million man-years of high-skilled jobs, over \$4 billion in steel orders, and more than \$20 billion in export dollar earnings over the next few years.

The threat stems from the Administration-backed Percy-Glenn Nuclear Anti-Proliferation Act of 1977, S. 897. According to Westinghouse, the world's leading nuclear reactor manufacturer, "If the Bill is passed in its current form it is likely that no nuclear export orders will be obtainable by U.S. nuclear manufacturers, with the exception of the few instances when there may be other overriding political-defense factors involved." Further, Westinghouse warns, "Even those few export orders could be lost because of the tangled and uncertain export processes and procedures required by the pending legislation. There is little in the legislation which restores the reliability of the United States as a supplier."

The bill, co-sponsored in its Senate version by Sens. Charles Percy (R-Ill.) and John Glenn (D-Ohio) has already been passed unanimously by the House of Representatives and even its firmest opponents regard Senate passage as certain, especially in view of the fact that national labor unions and industry have to date mounted only a feeble opposition to the bill.

## \$22 BILLION IN ORDERS THREATENED

The market the U.S. stands to lose is stupendous, according to extremely conservative estimates made recently in a private marketing study by a leading U.S. nuclear supplier.

Using only the most "practical" current estimates, the marketing study reports that between 1978 and 1982, there will be an export market for construction of 88 nuclear power reactors, totally approximately 88,000 megawatts of electric power production capacity (these figures of course exclude the United States' domestic power needs.) The study shows that, even assuming growth in the nuclear export capacity of West Germany, France, Italy, Canada, and several other countries, the U.S. share of the total projected market will be at least 64 nuclear power plant installations out of the total of 88.

In terms of orders, these nuclear power plants will incorporate the highest-technology inputs of steel, machine tooling, and construction of any export sector outside aerospace-defense. According to the study, the export of 64 reactors over the next five years would generate U.S. orders for more than 6.4 million tons of stainless, low-grade, and equipment steel with a dollar value, not counting inflation, of some \$4.2 billion.

Total export dollar earnings for these 64 reactors, assuming an average U.S. share of \$353 million per plant, would be \$22.6 billion.

In terms of jobs, taking a rather conservative estimate of 2.5 indirect jobs resulting from every new job created in the nuclear industry directly, these 64 export reactors would provide some 2,180,000 man-years of the most advanced, high-wage, skilled jobs in the labor market. Moreover, these jobs will fall heavily in such areas as construction, steel, transport, and electrical, which have been hard-hit by layoffs and loss of orders in the recent economic downturn.

Even before passage, the Percy-Glenn bill has contributed to the loss of eight potential nuclear orders by Iran, at the cost of some 182,000 man-years of U.S. jobs. In his widely-publicized visit to Washington last month, Shah Mohammed Reza Pahlavi held up the international uncertainty caused by such legislation as the principal reason why Iran will not agree to purchase the eight reactors from the U.S. The same month, Iran successfully negotiated purchase of several billions of dollars worth of reactors from West Germany and France.

*Amount of steel included in one nuclear reactor export to a developing country*

[Based on a 1,100 Megawatt unit]

	Tons
Low-grade Steel.....	43, 000
Stainless Steel.....	4, 000
Equipment Steel.....	53, 000
Total (approximately per reactor).....	100, 000

	<i>In millions</i>
Low grade at \$250 per ton-----	\$10.7
Stainless at \$500 per ton-----	2.0
Equipment at \$1,000 per ton-----	53.0
Total (approximately per reactor)-----	66.0

#### U.S. PRODUCERS ALREADY REELING

The Percy-Glenn legislation would sound the death knell for a U.S. nuclear export industry that is already reeling due to inadequate government support.

Between 1973 and 1976, when world nuclear demand expanded considerably in the face of the OPEC oil price rise, the U.S. nuclear industry lost reactor export contracts in 14 separate projects, worth a conservatively estimated \$5 billion in U.S. export earnings and 300,000 man-years of high-skilled jobs for U.S. workers. The primary reason for the loss of all but one of the 14 contracts was the lack of U.S. government support, uncertainty of U.S. export policies, and financing problems directly related to enforced policy changes in the U.S. government's Export-Import Bank for nuclear export credit guarantees. These lost sales included reactor agreements with Iran, Finland, Korea, Spain, Brazil, South Africa, and Belgium.

All of these contracts, according to industry estimates, could easily have been secured under previous U.S. government export policies prevailing as recently as five years ago.

The result, in the estimate of a top official of the Bechtel Corporation, is that whereas the U.S. nuclear reactor industry held 90 percent of the international export market, today the U.S. is scrambling to hold 40 percent of this same market.

Not only is the loss of this export margin costing U.S. workers jobs directly, but, say industry experts, it was crucial in allowing maintenance of economies of scale in combination with domestic reactor construction.

#### CAN THE AMERICAN SYSTEM OF GRADUATE EDUCATION OF YOUNG SCIENTISTS ALSO SERVE TO TRAIN FOREIGN SCIENTISTS TO EFFECTIVELY ADDRESS CURRENT TECHNOLOGICAL PROBLEMS IN THEIR OWN COUNTRIES

(Submitted by Patrick A. Dreher, Department of Physics—graduate student, University of Chicago, Chicago, Ill.)

The American graduate schools in the sciences in the 20th Century have trained many outstanding scientists and engineers who have helped to both solve some of America's technological problems and advance the general level of scientific knowledge. This situation has in many ways helped to place the United States as one of the strongest economic and military powers in the world. To maintain this position in the sciences, both the Federal Government and private industry have invested in research and development projects on a large scale. A part of this money has been distributed to graduate schools in the form of research grants under the sponsorship of a faculty member of the school. This faculty member in turn, usually hires graduate students who both assist him on the project and use the work as a partial fulfillment for an advanced degree.

Thus while providing the foreign graduate students with an excellent technical education and research experience that is designed for solving engineering and scientific problems for a developed nation, the question must be asked, "Will the methods and techniques applicable to the problems of the United States serve as the best standard to foreign graduate students regarding the solution of technical problems in the less developed countries?" In some cases I think not. Yet it would seem appropriate that the developed nations in some way assist the developing nations with regard to scientific and technical information.

In formulating a policy to train foreign students in science and engineering, perhaps some emphasis should be placed on encouraging the foreign students, after completing their classroom work at an American graduate school, to consider thesis research on problems that directly affect their nation. This type of an arrangement would differ from the standard research assistantship administered under the major professor. It would first require the proposal of an appropriate problem that needed to be researched, the consent of the faculty member who will serve as the major professor, the graduate student, the administration of the school as well as the cooperation of both the United States and

the foreign nation being represented by the graduate student. If it is possible to construct this type of arrangement, I believe it will prove a much more fruitful experience for all parties concerned and provide the developing countries with scientists and engineers more familiar with the technological questions they must face at home and better capable of providing the needed solutions to these problems.

DEPARTMENT OF AGRICULTURE,  
OFFICE OF THE SECRETARY,  
Washington, D.C., January 25, 1978.

HON. ADLAI E. STEVENSON,  
Chairman, Subcommittee on Science, Technology, and Space, U.S. Senate,  
Washington, D.C.

DEAR MR. CHAIRMAN: The Department has traditionally been heavily involved in efforts to assist developing countries through science and technology. Much of the current activity had its beginnings in USDA during and immediately following World War II. We are in full partnership now with the Agency for International Development with around 400 agricultural technicians involved each year in resident or short term assignments in developing countries in support of AID's program. USDA also arranges all of the training in agricultural fields financed by AID or the United Nations.

The Department is also becoming involved with developing countries willing to finance technical assistance directly. We have approximately 20 technicians from the Department in Saudi Arabia under the Joint Commission for Economic Development. These activities are entirely reimbursed by the Government of Saudi Arabia. We have additional programs in action, or being planned, in Iran, Algeria, Turkey, Venezuela, and Brazil.

In addition to the programs of technical assistance for which USDA is reimbursed for its participation, many of the agencies have programs of scientific exchange with many developing and developed countries.

I will respond to the specific questions of your letter of January 6.

1. The programs which I have listed above will certainly be involved in the Government's preparation for the 1979 U.N. Conference on Science and Technology for Development.

2. We have been involved in this preparation for more than 18 months and as a result different individuals have been designated as Departmental representatives. In October I created a special position in my office of Special Assistant for International Scientific and Technical Cooperation. Dr. Quentin M. West, who has been involved in these kinds of activities within USDA for more than 8 years, was appointed to that position. He has been asked to serve as the Departmental Representative on the Interdepartmental Panel for the U.N. Conference.

3. As an indication of the priority which we place on this activity, I am enclosing a copy of a letter which I sent to Secretary Vance July 5, 1977. We have established an internal working group to coordinate the Department's participation in these preparatory activities. Dr. West is chairing this working group and has been in contact with Ambassador Wilkowski.

Sincerely,

BOB BERGLAND, Secretary.

THE SECRETARY OF COMMERCE,  
Washington, D.C., February 8, 1978.

HON. ADLAI E. STEVENSON,  
Chairman, Subcommittee on Science, Technology and Space, Committee on Commerce, Science and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Thank you for your letter of January 6 requesting a response to questions relative to Department of Commerce support for U.S. preparations for participation in the 1979 United Nations Conference on Science and Technology for Development.

The following paragraphs are addressed to the numbered questions in your letter:

1. The Department of Commerce has a policy of participating in any international program which can contribute to the pursuit of its statutory mandate

to encourage, serve and promote the economic development and technological advancement of the United States. Programs in which the Department participates for these objectives which involve the transfer of technology to developing countries range from joint efforts for advancing the science of oceanography (the National Oceanic and Atmospheric Administration) and helping to coordinate world metrology standards (the National Bureau of Standards) to participation in international patent and trademark conventions (the Patent and Trademark Office) and efforts to increase the dissemination of publicly-available technological information (the National Technical Information Service). In addition to continuing efforts to pursue its major program objectives through regularly-available international channels, the Department has a policy of participating in any special activities which can advance these objectives, such as the United Nations Conference on Science and Technology For Development.

Please be assured that the lessons learned and experienced in the above programs will be made available to the State Department for its preparation for the 1979 U.N. Conference. My staff is cooperating with Ambassador Wilkowski's office on specific actions in support of this commitment.

2. I have designated Jordan J. Baruch, Assistant Secretary for Science and Technology, to be the Department's representative in efforts to coordinate Federal agency contributions to the Conference preparatory process.

3. The Department attaches a high priority to preparations for the Conference, not simply because of the benefits we believe it can bring to the United States but because, in contrast, we feel that failure to prepare effectively can have long-range negative repercussions not just on U.S.-developing country official relations, but on the likelihood that American inventive and technological skill can meaningfully contribute to the economic and technological growth of the developing countries.

In accordance with this priority we have prepared a proposed program dealing with "Technology Transfer for Industrial Application". The program as currently envisaged would involve two major meetings hosted through the National Bureau of Standards to integrate the views of U.S. and foreign experts who have "hands on" experience in the transfer of technology to developing countries. Participants in the meetings would be drawn from: American public, private and academic sectors who have worked on specific projects on the industrialization of developing countries; and citizens of developing nations who have worked on development projects and are well informed about the depth, structure, and realities of U.S. resources which may be used for industrial development in other countries.

Our purpose would be to provide a major policy input for U.S. participation in the industrial technology transfer aspects of the Conference. Details have been submitted to Ambassador Wilkowski to obtain her concurrence and support.

Note additionally, we will continue to research other avenues by which the Department can play a useful role in the preparatory efforts. For example, we are discussing various ways in which public funding could be secured for research and development by American companies of technology appropriate for export to the developing countries.

We greatly appreciate the Subcommittee's interest in this subject and would be pleased to furnish any further information desired.

Sincerely,

JUANITA M. KREPS.

ASSISTANT SECRETARY OF DEFENSE,  
Washington, D.C., January 26, 1978.

Hon. ADLAI M. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, U.S. Senate, Washington, D.C.*

DEAR SENATOR STEVENSON: This is in reply to your letter to Secretary Brown regarding the nature and extent of the Department's efforts to assist developing countries through science and technology and the Department's activities in support of preparations by the U.S. Government for the U.N. Conference on Science and Technology for Development in 1979. Answers to your specific questions are given below.

1. The defense transfer programs, i.e., foreign military sales and grant military assistance, administered by Defense within approved policies established by the Secretary of State, are the principal means of transferring scientific

and technological knowledge, activities and equipment to developing countries. For example, military construction programs may improve port, storage and transport facilities. Improvements in military communications may create or modernize a network that can also serve the government and private sectors. It is U.S. foreign policy to provide the technical training, on a sales or grant basis, where needed to enable developing countries to operate their new equipment and facilities. These and any other relevant U.S. programs and policies, administered by Defense, will be considered in the U.S. Government's preparations for the 1979 U.N. Conference.

2. The Department of State has informed us that an Interdepartmental Panel to coordinate preparations will be created. Dr. Ellen Frost, Deputy Assistant Secretary of Defense for International Economic Affairs, will be the Defense representative.

3. The Department of Defense attaches a high priority to supporting the U.S. Government's preparations for the 1979 U.N. Conference, insofar as our programs and policies are relevant. Dr. Frost is chairing a DoD group considering the Department's role in the preparatory activities.

Sincerely,

DAVID E. MCGIFFERT,  
*Assistant Secretary of Defense,  
International Security Affairs.*

DEPARTMENT OF ENERGY,  
*Washington, D.C., February 8, 1978.*

HON. ADLAI E. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, U.S. Senate,  
Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to your letter to Secretary Schlesinger requesting information on the Department of Energy's activities in support of the United Nations Conference on Science and Technology for Development, 1979.

The transfer of energy technology is a major topic in continuing discussions in the "North-South dialogue." The strong Department of Energy interest is reflected in a number of specific current activities. We participate in several Science and Technology Commissions and Energy Working Groups with developing countries, e.g., Egypt, Iran, Brazil, Mexico and India. An agreement for geothermal cooperation with Mexico has been concluded and discussions are underway on joint research projects in solar energy with India.

The Department of Energy has also assumed program management responsibility for a pilot program developed by an interagency group chaired by the Department of State to help selected developing countries evaluate their energy options, both conventional and unconventional. This program is funded in the Department of Energy's fiscal year 1978 budget at a level of \$2.6 million.

Under the terms of a November 15, 1976 Memorandum of Understanding, the Department of Energy is cooperating with the Agency of International Development in carrying out programs of cooperation with developing countries in renewable and unconventional energy technologies, as mandated in the 1977 foreign assistance legislation.

These ongoing cooperative activities with developing countries should provide useful background and experience in suggesting U.S. positions and options for the 1979 Conference and in shaping future initiatives.

Nelson Slevering, Deputy Assistant Secretary for International Programs, has been chosen to coordinate the Department of Energy efforts with the Interdepartmental Panel.

As you can see, we assign a high priority to the subject of energy technology transfer to developing countries in general and to the preparations for the Conference. Members of my staff have participated in the preparatory discussions since 1976. On the basis of discussions with the Coordinator's staff, we plan to chair an interagency study group on energy on the assumption that the agenda for the Conference will include energy as a topic. This study group will be formed after receiving instructions from Ambassador Willkowski in February.

Sincerely,

HARRY E. BERGOLD, Jr.,  
*Assistant Secretary for International Affairs.*

U.S. ENVIRONMENTAL PROTECTION AGENCY,  
Washington, D.C., January 30, 1978.

Hon. ADLAI E. STEVENSON,  
Chairman, Subcommittee on Science, Technology and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in response to your January 6, 1978 letter regarding EPA activities in support of the 1979 U.N. Conference on Science and Technology.

During 1976 EPA participated in a Department of State Ad Hoc Planning Group for the Conference, during which we stressed the need for the United States to share environmental expertise with all countries seeking to protect the biosphere through resource management and control of pollution. It is, we believe, in our national interest to help the developing world avert pollution problems associated with growth and industrialization by incorporating existing knowledge and technologies into development plans. The U.N. Conference could provide opportunities for practical application of existing knowledge to development processes at a time and in a manner that could minimize adverse environmental effects.

Following are answers to the specific questions in your letter:

1. What principal programs and/or policies of the Department relate to transferring scientific and technological knowledge, activities, or equipment to developing countries? Will these programs and policies be considered in the U.S. Government's preparations for the 1979 U.N. Conference?

EPA authority for international cooperation derives from the National Environmental Policy Act [PL 91-190 (1970) Section 102 (2) (B)] which directs "... all agencies of the Federal Government to recognize the worldwide and long-range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment."

Although EPA lacks the budgetary and manpower resources for large-scale technical assistance efforts, we do provide consultants and technical information through international organizations, principally the United Nations Environment Programme (UNEP) and the World Health Organization (WHO). Also, we are currently cooperating with the Agency for International Development (AID) in development of environmental programs.

2. Have you designated a Departmental representative to serve on the Inter-departmental Panel being organized by the Department of State to coordinate Federal agency contributions to the Conference preparatory process? If so, who is that person? If not, when will such a representative be appointed?

We understand that the Environmental Protection Agency will be asked to serve on the Panel but have not yet received a request. According to the Department of State, letters are to be sent to the agencies next week regarding representatives on the Panel. At that time we will be pleased to inform you of the EPA person who will serve on the Panel.

3. What priority does your Department attach to the U.S. Government's preparations for the 1979 Conference? Have you established an internal working group or similar activity to consider the Department's role in these preparatory activities?

It is too soon to know what the role of this Agency will be in preparing for the U.N. Conference. As soon as we have guidelines from the State Department we will inform you of how EPA will be able to contribute to the U.S. Government preparations for the Conference.

As soon as possible we will provide you with responses to the above questions.

Sincerely yours,

DOUGLAS M. COSTLE.

THE SECRETARY OF HEALTH, EDUCATION, AND WELFARE,  
Washington, D.C., February 13, 1978.

Hon. ADLAI E. STEVENSON,  
Chairman, Subcommittee on Science, Technology and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Thank you for your letter of January 6 concerning preparations for the 1979 U.N. Conference on Science and Technology for Development. I welcome this opportunity to describe briefly those programs and activi-

ties of the Department of Health, Education, and Welfare that relate to the purposes of the Conference, and to express our willingness to participate fully in Conference preparations.

This Department lacks the legislative mandate to engage directly in programs that transfer scientific and technological knowledge, activities, or equipment to developing countries. Nevertheless, HEW agencies administer such activities on behalf of other Federal agencies or foreign governments. Likewise, many of our cooperative activities, especially those funded with excess foreign currencies, are conducted with developing countries.

Health is a major component of U.S. assistance programs in the developing world. Although these programs are primarily a responsibility of the Agency for International Development (AID), HEW's Public Health Service (PHS) actively participates with AID in providing substantial assistance in health, family planning, and nutritional activities. Emphasis has been placed on integrating these activities and on promoting and supporting developing country capability in health sector analysis and planning and the development of relevant, cost-effective methods of health services delivery and health manpower training resources. Other examples of PHS agency activities in developing countries include nutrition and demographic surveys; responding to international epidemiologic needs; and training developing country nationals in health statistics methods and skills.

The Public Health Service is also involved in both formal and informal cooperative activities with many countries to develop and share medical knowledge beneficial to the nations involved and to the health status of all people. Among formalized activities supported with excess foreign currencies are projects under the aegis of the U.S.-Egypt Joint Working Group on Medical Cooperation, the U.S.-Yugoslav Joint Fund for Scientific and Technological Cooperation, the U.S.-Polish Agreement for Cooperation in Health, and the U.S.-India Joint Cooperation Commission.

International education programs administered by HEW's Office of Education (OE) primarily strengthen the capacity of American educational institutions for teaching and research in modern foreign languages, area studies, and world affairs. Certain of OE's activities are funded, however, by AID and the Bureau of Educational and Cultural Affairs (CE) of the Department of State. On behalf of CE, OE arranges educational training programs for foreign educators in such fields as administration and supervision; teaching English as a second language; American civilization studies; teacher education; special education; and vocational, technical and adult education. Training includes regular courses, special seminars, and observation of demonstration and research centers. OE also receives 1,200-1,500 visiting educators each year from approximately 90 countries. Many are from developing nations seeking to learn about the latest developments and innovations in American education. OE provides published materials, and arranges visits to schools, universities, State Departments of Education, research centers and other relevant programs.

Other HEW agencies are similarly involved, although to a lesser extent, in programs involving developing countries. The Social Security Administration, for example, provides training for officials of social security institutions and the services of experts to advise developing countries in all aspects of social security from the initiation of a program to the improvement of program administration. These activities are supported by AID, multilateral aid agencies, foreign governments, or by U.S. and foreign foundations. Through reimbursable arrangements with AID and international donor agencies, technical experts from SSA and other sources also serve on short-term advisory missions to developing countries to assist these countries establish social security programs. The Office of Human Development Services also administers programs of international research and training. The research programs, using excess foreign currencies, focus on rehabilitation engineering, rehabilitation medicine, mental retardation and sensory disorders, social development, public welfare policy and planning, family and child care, and problems of special groups, such as aging and youth. These research projects have been concentrated in Egypt, India, Tunisia, Poland, and Yugoslavia. OHDS also provides training programs for foreign nationals sponsored by AID, or who are United Nations Fellows, or are sent by other agencies or foreign governments.

Officials of this Department have been working with staff of the Department of State for some time in preparation for the U.N. Conference. In my immediate office, Peter Bell is a Special Assistant for International Affairs and Laurence Wyatt, Director of the Office of International Affairs, is in touch with Amba-



sador Wilkowski to keep abreast of her plans and to offer our assistance in any ways that will be helpful. We understand that the Department of State will soon invite HEW to serve on a policy group related to the Conference and to organize study groups on education and health. We will, of course, be most happy to do this, taking advantage of the experiences we have gained from the programs and activities in these fields that I have described above.

I am convinced that the United States has much to contribute to the U.N. Conference on Science and Technology for Development, and I am prepared to lend the expertise of this Department to help insure the Conference's success.

Sincerely,

JOSEPH A. CALIFANO, Jr.

THE SECRETARY OF HOUSING AND URBAN DEVELOPMENT,  
Washington, D.C., February 3, 1978.

Hon. ADLAI E. STEVENSON,  
U.S. Senate, Washington, D.C.

DEAR SENATOR STEVENSON: This is a further response to the inquiries contained in your letter of January 6 concerning our involvement in the preparations for the 1979 U.N. Conference on Science and Technology for Development.

Although the Department does not have a technical assistance program, a variety of HUD programs and research efforts have potential for transfer to developing countries. These include management and maintenance of housing, energy conservation, the citizen participation process, application of new technology, disaster response, physical planning, standards and code administration, etc. In these and other programs, the key would be "adaptation" rather than "adoption," as the concept of appropriate technology is utilization of what is locally acceptable relative to social and economic conditions.

HUD's Office of International Affairs responds to requests from abroad. During 1977 some 14,000 documents were sent to less developed countries through routine exchange and in response to more than 200 specific requests. During the same period, 25 programs for consultation and briefing were prepared for 44 official and private visitors from less developed areas.

Support of U.S. foreign policy and programs is provided by HUD advisory services to, and participation in, United Nations conferences and seminars on a variety of subjects as requested by the Department of State.

Mrs. Tila Maria de Hancock, HUD Assistant for International Affairs, met with Ambassador Wilkowski and is maintaining contact with the Office of Urban Development of the Agency for International Development. The Department has participated in preparations for the conference since planning began in the Fall of 1976. Our activities included membership in the first interagency committee and in two drafting groups. We are now awaiting guidance from Ambassador Wilkowski as to how HUD can best assist in the program preparation process.

I assure you of my continued interest and support of U.S. preparations for the U.N. Conference, and I look forward to our country making significant contributions to it.

Sincerely yours,

PATRICIA ROBERTS HARRIS.

U. S. DEPARTMENT OF THE INTERIOR,  
OFFICE OF THE SECRETARY,  
Washington, D.C., January 26, 1978.

Hon. ADLAI E. STEVENSON,  
Chairman, Subcommittee on Science, Technology and Space, U.S. Senate,  
Washington, D.C.

DEAR SENATOR STEVENSON: Thank you for your letter of January 6 inquiring about the nature and extent of the Department's efforts to assist developing countries through science and technology and, in particular, about the Department's activities in support of United States Government preparations for the 1979 UN Conference on Science and Technology.

The answers to the specific questions asked in your letter are enclosed. I would like, however, to make some general remarks in response to your inquiry.

A number of the technical agencies which constitute the core of this Department have been active in developing countries scientifically and technically for almost half a century. For example, the Geological Survey and the Bureau of Rec-

lamation have been active in Latin America from time to time over a period exceeding 40 years. Most, if not all, of this work was done at the request of AID as a part of U.S. foreign policy.

Scientific and technical work in developing countries of Asia and Africa, as well as Latin America, has been continued over the years by a number of Interior agencies. However, the work now is performed not only at the request of AID but also in response to various U.N. organizations, to the Organization of American States, and increasingly, to foreign governments. Except in very specific and limited instances in which a significant domestic interest can be identified, Interior's appropriated funds are not used to finance this type of work.

With regard to support of U.S. preparations for the UN Science and Technology Conference, this Department is in a position to make a contribution in the form of knowledge of and experience in a variety of scientific and technical arenas. However, as is already widely acknowledged throughout the Federal Government, the principal transfer of U.S. science and technology for development must come from the private sector. Interior participated extensively in previous U.S. preparatory efforts conducted during 1970. However, Interior has not yet been contacted about taking part in current preparatory efforts. We are ready to do so after learning the content and organization of those efforts.

Sincerely,

CECIL D. ANDRUS,  
*Secretary.*

Enclosure.

REPLIES TO QUESTIONS IN SENATOR STEVENSON'S LETTER OF JANUARY 6, 1978, TO  
THE SECRETARY

1. The Interior Department's varied and wide-ranging scientific and technical capabilities have been applied in upwards of 70 developing countries with programs whose underlying principle is the nurturing of indigenous capabilities to manage and wisely use valuable natural resources.

*Minerals.*—The Geological Survey implements programs to help developing countries strengthen their earth-resource institutions; to conduct their own efforts aimed at discovery, appraisal and management of minerals resources; to introduce new concepts and methods of investigation; and to promote continuing cooperation on problems of mutual interest. In the process, the Survey has sent scientists and engineers to more than 1,100 projects in over 70 countries.

The Bureau of Mines has trained upwards of 700 foreign citizens from about 60 countries in mining and metallurgical technology, minerals policy and legislation, and basic minerals research. The Bureau and the Mining Enforcement and Safety Administration have conducted projects ranging from general minerals economics surveys to operations designed to initiate or expand industrial activity, improve minerals operations efficiency, and improve health and safety protection for miners.

*Water resources.*—In addition to working directly in some 60 countries over the years on such projects as planning for dam construction or analyzing river basin potentials, the Bureau of Reclamation has trained more than 4,000 nationals from over 100 countries in the skills of devising water objectives, establishing water standards and procedures, preparing water legislation, designing organizations to implement water objectives, and selecting water development priorities.

*Land.*—Land problems in developing countries are in many instances similar to those the United States has already encountered and overcome. The Bureau of Land Management has advised foreign governments on technical aspects of land reform, planned and set up demonstration range management as a profession and developed curricula at vocational schools, and trained foreign nationals in land classification, land use planning, environmental analysis, cadastral surveying, fire control, and land appraisal and record-keeping. The Bureau initiated the first available multiple-use management training course for foreign government officials.

*Fish and wildlife.*—Countries of Asia, Africa, and Latin America benefit from programs of the Fish and Wildlife Service that include studies of the distribution, abundance, and ecological relationship of fish and wildlife species; fish culture production and management; management of species threatened with extinction; and remedying vertebrate pest infestations in agriculture and cattle-raising.

*Parks and recreation.*—The National Park Service has counselled dozens of developing countries on proposed parks programs and has provided parks management training to many foreign nationals. Technical experts from the Service

have taken official posts abroad as park directors, have taught seminars, and have participated in public relations programs. Among some general purposes of these activities are improvement of world environmental quality, stimulation of preservation of the world's cultural and natural heritage, and encouragement of foreign travel to the United States. The Bureau of Outdoor Recreation has assisted in research, planning, and development of recreational facilities.

Participation in U.S. preparations for the U.N. S&T Conference could involve any of these programs.

2. Interior has not designated a Departmental representative to serve on an Interdepartmental Panel to coordinate preparations for the 1979 U.N. S&T Conference. We understand the State Department has not yet organized the Panel. In any case, Interior has not been contacted about participation.

3. The Interior Department has not attached a priority to preparations for the U.N. S&T Conference, since we have not yet been contacted regarding participation; nor have we, therefore, established a working group or similar activity.

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U.S. DEPARTMENT OF LABOR,  
OFFICE OF THE SECRETARY,  
Washington, D.C., January 31, 1978.

Hon. ADLAI E. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.*

DEAR SENATOR STEVENSON: This is in response to your letter of January 6, 1978, with regard to the preparations for the U.N. Conference on Science and Technology for Development.

Ambassador Wilkowski has been in touch with us on the subject and we are prepared to cooperate fully when the interagency panel is formally established. The Department's contribution will be coordinated by our Bureau of International Labor Affairs. Howard D. Samuel, Deputy Under Secretary for International Affairs will be designated as the Department's representative with appropriate staff support.

The Department does not have programs and policies specifically geared to the U.N. Conference. Our point of departure on this subject, and related trade and investment issues, is to assess policy proposals in terms of their impact on domestic employment opportunities. We recognize the need to improve the economic well being of the developing countries and the standards of living of the workers in those countries. Decent wages, hours, working conditions and the right of workers to organize into free trade unions will promote the growth of democratic institutions in those countries and contribute to the development of fair trade.

We are engaged in AID supported programs to provide technical assistance to developing countries with respect to labor and manpower problems.

If you have any further questions, please let us know.

Sincerely,

RAY MARSHALL,  
Secretary of Labor.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,  
Washington, D.C., February 16, 1978.

Hon. ADLAI E. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: This is in response to your letter of January 6, 1978, concerning the U.N. Conference on Science and Technology for Development in 1979. Thank you for the opportunity to comment on NASA's activities in support of preparations by the U.S. for the Conference. NASA has been working with the State Department over the past year and has identified to the Department (and to appropriate offices in the White House) those NASA activities that are relevant to the U.S. participation.

Responses to your specific questions follow.

*Question 1.* What principal programs and/or policies of the Department relate to transferring scientific and technological knowledge, activities, or equipment to developing countries? Will these programs and policies be considered in the U.S. Government's preparations for the 1979 U.N. Conference?

Answer. The most promising space capabilities for the purposes in hand appear to be the earth resources survey and direct broadcast capabilities which are already providing, and, we believe, could increasingly provide the benefits of advanced technology to developing countries. In addition, there are several smaller projects which may be of interest. We have provided information to Ambassador Wilkowski, Assistant Secretary Mink and others on these capabilities and understand they will be considered in the U.S. preparatory effort. By way of illustration, we have suggested that a major focus for (and high U.S. visibility in) the assessment and management of international development could be achieved by establishing regional multi-disciplinary institutes in conjunction with Landsat ground stations in Africa.

*Question 2.* Have you designated a Departmental representative to serve on the Inter-departmental Panel being organized by the Department of State to coordinate Federal agency contributions to the Conference preparatory process? If so, who is that person? If not, when will such a representative be appointed?

Answer. The Department of State has asked NASA to participate on a continuing basis in an interagency policy group. Mr. Norman Terrell of our International Affairs Division will represent us.

*Question 3* What priority does your Department attach to the U.S. Government's preparations for the 1979 U.N. Conference? Have you established an internal working group or similar activity to consider the Department's role in these preparatory activities?

Answer. We assume that any opportunity to upgrade the economies of developing countries and to reduce their dependence upon U.S. monetary aid is in our national interest and is vigorously supported. Accordingly, we are enthusiastically supporting the Administration's lead in this area.

Mr. James Zimmerman of our International Affairs Division will coordinate the efforts of our technical personnel in support of the U.S. preparatory activities for the 1979 Conference.

Very truly yours,

ROBERT A. FROSCH,  
*Administrator.*

P.S.—Subsequent to the typing of this letter I had an opportunity to discuss this matter with Mr. William Maynes, Asst. Sec., State for International Organizations. I suggested some possible ideas for NASA contributors to him.

R.

DEPARTMENT OF THE TREASURY,  
Washington, D.C., January 30, 1978.

HON. ADLAI E. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, U.S. Senate, Washington, D.C.*

DEAR MR. CHAIRMAN: This letter is in reply to your letter of January 6 to Secretary Blumenthal concerning participation by the Department of the Treasury in the United States Government preparations for the U.N. Conference on Science and Technology for Development.

The Treasury Department has a strong interest in the development of scientific and technological capabilities of the Third World, and looks forward to the 1979 U.N. Conference on that subject. The following are answers to your specific questions on Treasury Department activities:

1. Secretary Blumenthal serves as the co-Chairman of the United States-Saudi Arabian Joint Commission on Economic Cooperation. The Department of the Treasury serves as the coordinating, or executive agency, for the Joint Commission which is active in reimbursable technical cooperation programs in a number of areas, including science and technology. An introduction to the Joint Commission and its programs can be found in the attached "Progress Report."

Three Joint Commission projects are specifically concerned with scientific and technological matters. The three projects, all of which are in early stages of development or implementation, are in the fields of solar energy research, desalinization, and the establishment of a national science center in Saudi Arabia (see attached project agreements).

Assistant Secretary for International Affairs C. Fred Bergsten is a member of the Board of Governors of the newly-formed Israel-United States Binational Industrial Research and Development Foundation. In this capacity, he reviews policies of the Foundation as well as specific research and development proposals.

At this time, it is unclear to what extent these programs and policies will be

considered in the U.S. Government's preparations for the 1979 U.N. Conference, because there has not yet been any inter-agency coordination in which the Treasury Department has participated whereby these programs have been examined.

2. Assistant Secretary for International Affairs Bergsten has been designated as Treasury Department representative to serve on the Interdepartmental Panel.

3. The Treasury Department looks forward to being an active participant in the U.S. Government's preparations for the 1979 U.N. Conference. No internal Treasury working group has been established as of yet; however, the procedure for coordination within Treasury will be established after the U.S. Government's operations get under way.

Sincerely,

GENE E. GODLEY,  
Assistant Secretary (Legislative Affairs.)

THE SECRETARY OF TRANSPORTATION,  
Washington, D.C., February 2, 1978.

Hon. ADLAI E. STEVENSON,  
Chairman, Subcommittee on Science, Technology and Space, U.S. Senate, Washington, D.C.

DEAR SENATOR STEVENSON: This responds to your letter of January 6.

I understand that Ambassador Jean Wilkowski of the State Department will be contacting other agencies in the near future regarding participation in U.S. Government preparation for the United Nations' 1979 Conference on Science and Technology for Development. I will make sure that the Department of Transportation cooperates fully with State's activities just as soon as the request is received.

Meanwhile, I am pleased to provide details about the nature and extent of this Department's efforts to assist developing countries through science and technology. Information in the enclosure is broken down according to the Office of the Secretary and those operating elements having relevant activities.

I hope this reply proves helpful to your Subcommittee.

Sincerely,

BROCK ADAMS,

Enclosure.

#### OFFICE OF THE SECRETARY (OST)

Under the terms of a General Agreement between the Department of Transportation and the Agency for International Development (AID), the Office of International Transportation Programs of the Office of the Secretary provides economic and technical advisory services to lesser developed countries (LDC's) at the request of AID on a reimbursable basis. Such support services include the furnishing of technical information and advice, backstopping of project services in LDC's and in-service training of officials in LDC's.

The Director of the Office of International Transportation Programs serves on the Steering Committee of the Transportation Research Board (TRB) of the National Research Council. TRB is in the process of carrying out a series of studies to determine the appropriate technology and the level of transportation services needed by LDC's in support of preparations by the U.S. for the UN Conference on Science and Technology for Development in 1979.

The Office of the Secretary (OST) provides representation to the United Nations' Economic and Social Commission for Asia and the Pacific (ESCAP), Committee on Shipping, Transport and Communications. Most member countries of ESCAP are considered developing nations. In addition to exchanging views at the ESCAP committee meetings, OST provides documentation regarding U.S. transportation to ESCAP for distribution to member countries.

Additionally, OST provides, upon request, assistance in arranging programs for foreign visitors which include many from lesser developed countries. In most cases these programs include meetings with DOT research and development officials. Technology is transferred by direct discussions as well as by presentation of documents and studies.

#### U.S. COAST GUARD

The Coast Guard does not have a program for transferring scientific and technological knowledge, activities, or equipment to developing countries. How-

ever, as resources permit, the Coast Guard does respond to specific requests for training or assistance which are channeled through the Department of State or the Department of Defense. Coast Guard personnel have been detailed to Jordan, Haiti, Egypt, and Saudi Arabia during the past year in connection with short-term projects.

In addition, the Coast Guard actively solicits applications from foreign nationals interested in attending the Coast Guard Academy. This is accomplished through U.S. diplomatic posts throughout the world. At present, students from Honduras, Iran, Nicaragua and the Philippines are included among the cadet corps.

Through existing bilateral agreements, the Coast Guard is responsible for training local nationals to assume many of the operational positions in Argentine and Liberian OMEGA (long range navigation system) stations.

#### FEDERAL AVIATION ADMINISTRATION

It is the policy of the Federal Aviation Administration (FAA) to provide assistance within statutory authority and U.S. Government policies to foreign governments (or international organizations) requesting such assistance in furtherance of their aviation improvement programs.

The FAA provides this assistance under the terms of specific agreements established directly with the aviation authorities concerned or with sponsoring organizations such as the Agency for International Development (AID), United Nations Development Program (UNDP) agencies, or international lending institutions. Assistance is furnished by groups of FAA specialists (Civil Aviation Assistance Groups) residing in host countries or by short-term assignment of experts recruited from the entire organization. Overall assistance may include training at FAA facilities, flight inspection, system planning, organization and management, development of regulations and procedures, feasibility studies, evaluation and airman certifications.

In line with OMB Circular A-25 and other references, it is the policy of the FAA to recover the full cost of providing assistance to non-federal parties. In very exceptional cases and for reasons of national interest, a waiver may be formally granted in accordance with FAA directives.

The preponderance of FAA technical assistance is financed by the host country itself. In the training of foreign aviation specialists in the U.S., however, about 40 percent are trained under the sponsorship of the International Civil Aviation Organization (ICAO) or AID. In recognition of the special needs of the economically less-developed countries, the FAA grants a waiver of 40 percent of the tuition costs for courses taken at its Oklahoma City Academy by nationals of such countries.

Under the current program, resident advisory groups are operating in Oman, Kuwait, Iran, Venezuela, Taiwan, and Spain. The training program is operating at the rate of approximately 400 participants a year.

#### FEDERAL HIGHWAY ADMINISTRATION

The Federal Highway Administration is actively pursuing a program of transferring technical assistance, knowledge, and equipment to developing countries in the highway field. Cooperation with foreign countries is specifically authorized under Section 308 of Title 23 U.S.C. This cooperation and transferral of technical assistance is accomplished in the following ways:

Active participation in International Congresses, meetings, workshops, etc. Of special importance, is the full cooperation and participation of FHWA in the Pan American Highway Congress.

The Foreign Projects Division transfers to other countries the experience and technology that has been gained in the United States in the fields of highway planning, design, construction, and maintenance. This activity is carried on with the full cooperation and knowledge of the State Department. In most cases, current projects are funded on a fully reimbursable basis by the host government.

During the past three decades, FHWA engineers have traveled throughout the world on special programs of cooperation and assistance to developing countries. Major programs were initiated or completed during this period in Ethiopia, Burundi, Iran, Jordan, Liberia, Turkey, Philippines, Laos, Cambodia, Yemen, Brazil, Argentina, Bolivia, Peru, Nepal, Sudan and the Dominican Republic. At present, an active Mission is continuing in Kuwait and a new Mission is being initiated in Saudi Arabia. All these technical Missions have been char-

acterized by an intensive effort to provide adequate training and selective procurement of equipment to do the job.

The FHWA is continually distributing technical manuals, bulletins, specifications, etc., to developing countries. An example is a group of manuals and computer programs describing a "Rural Highway Transportation Planning System" which is presently being completed by the FHWA primarily for use by developing countries. These manuals are being published in both English and Spanish. The English version has already been distributed to approximately 30 countries. In the near future, sets of the manuals in Spanish will be distributed to all Spanish-speaking countries.

#### FEDERAL RAILROAD ADMINISTRATION

The Federal Railroad Administration (FRA) has no current activity which directly assists specific developing countries. Several program areas could, however, provide such assistance.

FRA carries out extensive research and development work to improve railroad technology. The Office of the Associate Administrator for Research and Development publishes an average of 100 technical reports each year based upon this research. Appropriate organizations in developing countries should be placed on standard mailing lists for possible benefit from technological innovations. Additionally, FRA could provide test and evaluation results from railroad hardware and equipment tests carried out at the Transportation Test Center at Pueblo, Colorado.

The FRA funds and manages the operations of the Railroad Research Information Service (RRIS), which publishes twice annually a Bulletin containing bibliographies and abstracts of technical documents on railroad research matters. The material announced in the RRIS Bulletin contains literature from the U.S. as well as foreign sources and covers all important research work. A subscription to the RRIS (cost \$30/year) by the developing countries could be of considerable assistance by keeping them informed of the latest state-of-the-art in railroad terminology on a worldwide basis.

#### NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

The National Highway Traffic Safety Administration (NHTSA) has no specific programs related to transferring scientific and technological knowledge or equipment to developing countries. However, it is a continuing NHTSA policy to be cooperative and responsive to requests for advice and information from developing as well as other countries. Further, the policy includes providing information, reports, expert advice and support of the Department of State and other U.S. Government Agencies in their international activities which involve NHTSA areas of responsibility and experience.

NHTSA routinely provides reports and other information to foreign countries throughout the world; e.g., Korea, Vietnam, Malaysia, Saudi Arabia, Iran, Colombia, and Argentina as well as Russia, European countries and Japan. In addition, NHTSA frequently provides briefings and holds discussions with visitors from foreign governments. A typical example is the recent visit by the Director General of the Road Transport Department of Malaysia who was provided with two full days of briefings and extensive backup material.

Our largest activity with developing countries is in the Emergency Medical Services (EMS) area. The Guidelines developed by NHTSA for upgrading emergency medical services and ambulance design criteria have created significant interest outside the U.S. Iran adopted and translated the emergency medical technician (EMT) course into Persian several years ago. Tehran, the capital of Iran, has established a completely functional ambulance service equivalent to many of those in our large cities. Programs are underway in Alexandria and Cairo, Egypt. Ambulance design specifications have been drafted to meet Egypt's special needs which could be used by other interested Arab countries. The Egyptian Government is presently translating the EMT course into Arabic. Australia, Canada, Portugal, Germany, Israel, Japan, South Africa, the Canal Zone, and New Zealand have ongoing EMT training classes.

A considerable effort was expended in 1977 by NHTSA in providing training materials and briefings to representatives of foreign countries to add them in their EMS development. Included were 35 countries participating in the Agency for International Development (AID) program of the Department of State in addition to Finland, Saudi Arabia, Egypt, France and West Germany.

In response to a December 1977 AID request, NHTSA plans to send a senior level highway safety expert to Jordan for approximately two weeks. He will review Jordanian highway safety and driver education activities to provide advice/recommendations to various government agencies and formulate proposals for additional assistance if appropriate.

In conjunction with the International Association of Chiefs of Police (IACP) International Conference held in Los Angeles, California, during October of last year, NHTSA gave a special briefing to 17 foreign government policy officials. The briefing on highway safety programs emphasized police traffic services and our national 55 mph speed limit. This is an area of increasing interest and inquiry by developed and developing countries. For example, we are currently preparing a comprehensive highway patrol information package for the government of Colombia in response to their request.

NHTSA is also active in the United Nation's Economic Commission for Europe (ECE), Inland Transport Committee; specifically, the Working Party on Construction of Vehicles (WP-29) and the Group of Experts on Road Traffic Safety (GE-20). While these groups are Europe-oriented, most of the information and results of the work become available to developing countries through the United Nations.

U.S. INFORMATION AGENCY,  
Washington, D.C., January 16, 1978.

HON. ADLAI E. STEVENSON,  
*Chairman, Subcommittee on Science, Technology and Space, Committee on Commerce, Science and Transportation, U.S. Senate.*

DEAR MR. CHAIRMAN: This is in response to your inquiry regarding the United States Information Agency's role in assisting developing countries through science and technology and its preparations for the U.N. Conference on Science and Technology for Development. We are pleased to provide the following information.

Although technical assistance, as such, is excluded from the Agency's mission, we are engaged in numerous information and cultural exchange activities related to science and technology. The purpose of these programs is to inform foreign audiences of selected U.S. policies and progress in scientific and technological matters. Examples include past programs on the benefits of Earth Resources Technology satellites and current coverage of such matters as the transfer of technology to the developing countries and the search for alternative sources of energy.

A member of our advisory staff established contact with Ambassador Wilkowsky's office during the initial interagency consultations on the U.N. Science and Technology for Development Conference. As preparations for the conference progress, we will assign a Program Development Officer to maintain liaison with the interagency committee and to coordinate our public affairs support for the Department of State and other U.S. Government elements participating in the event. This officer will also ensure that Agency media coverage and programs reflect the policies and priorities by these agencies.

We hope this information will assist your Subcommittee in its review of preparations for the conference. As plans for the event develop, we will be happy to provide any further information you may require.

Sincerely,

JOHN B. REINHARDT,

#### SCIENCE AND TECHNOLOGY PROGRAMS IN THE UNITED STATES INFORMATION AGENCY

The United States Information Agency's traditional concern for Science and Technology has survived the trends and curves of other foreign policy interests as an area in which there has continually been great worldwide interest and in which the United States has always been the recognized leader.

While it is not the Agency's mission to engage in the transfer of actual technical or scientific systems or knowledge to other countries, we have sought to establish America's concern for the problems and potential that the sciences face in the present world, and American leadership in the development of technology to meet them. Regardless of any nation's relative advancement or state of industrialization, all peoples face the common problems of energy depletion, urban congestion, environmental pollution, population pressure, food shortages—problems which were not considered pressing just a decade or more ago.



nations look to the United States to provide the technological leadership and the administrative infrastructure required to solve them.

The Agency's primary programming resource is the Volunteer Speaker—the specialist who donates his time and experience for the purpose of engaging in productive dialogue with his colleagues abroad. Last year over 90 American specialists in the fields of science and technology visited over 60 countries, participating in seminars, lectures, formal and informal discussions, and a wide variety of other activities designed to enhance foreign understanding of and to foster participation in U.S. advances and achievements in this field.

As a primary complement to speaker activities, U.S.I.A.'s Motion Picture and Television Services produces and releases overseas each month two fifteen-minute color films called Science Reports. Each report visually describes one or two new innovations or advancements in a scientific field which are being developed for the betterment of peoples everywhere. The Science Reports have proven to be one of U.S.I.A.'s most valuable and popular products. The films division also regularly includes segments about the sciences and technology in other ongoing film productions. Television is playing an expanding role as numerous videotapes on scientific subjects and taped interviews with leading figures in the science are regularly supplied to overseas offices at their specific request.

The Exhibits Division is often called upon to represent, by means of its own creativity and ingenuity, those same scientific and technical qualities in large and small exhibitions which may travel to dozens of countries in almost every continent. Science and Technology, by virtue of its visible and sometimes even spectacular nature, is particularly suitable to visible representation, and has been the subject of a number of exhibits in recent years, reflecting the international interest in this area. Space exploration, solar energy and environmental protection are among the most popular subjects for these exhibits.

U.S.I.A.'s broadcasting and publications elements are especially active in the area of Science and Technology, since their activities, particularly the Voice of America, reach the largest number of people overseas. In keeping with traditional interest as evidenced in feedback surveys, VOA commensurately puts out a large amount of material, including the weekly New Horizons program and the daily Science Notebook, both of which are broadcast in several languages, as well as topical reporting of science-related news events which are covered as they happen. In response to numerous requests from our overseas offices, science stories, articles and texts of statements and interviews are regularly provided for placement in the foreign press and for use as backgrounders and information packets. The publications division also collaborates with the Department of Commerce in distributing regular articles and reports on U.S. industry and on new products available for international markets.

The goal of the United States Information Agency is to present and explain American society and policies to the people of other countries and to encourage direct dialogue between them and the people of the United States on common goals, values and problems. In today's world, technology and the sciences are a vital part of the framework on which international understanding and cooperation are being built. The 1979 U.N. Conference on Science and Technology for Development will highlight this fact; and this Agency, as executor of America's public diplomacy, has already recognized it by giving Science and Technology the prominent role it plays in all the Agency's ongoing activities.

